FAA AviationNews
AVIATION SAFETY FROM COVER TO COVER
MARCH / APRIL 2007

Sun 'n Fun' 2007

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FAA AviationNews

AVIATION SAFETY FROM COVER TO COVER

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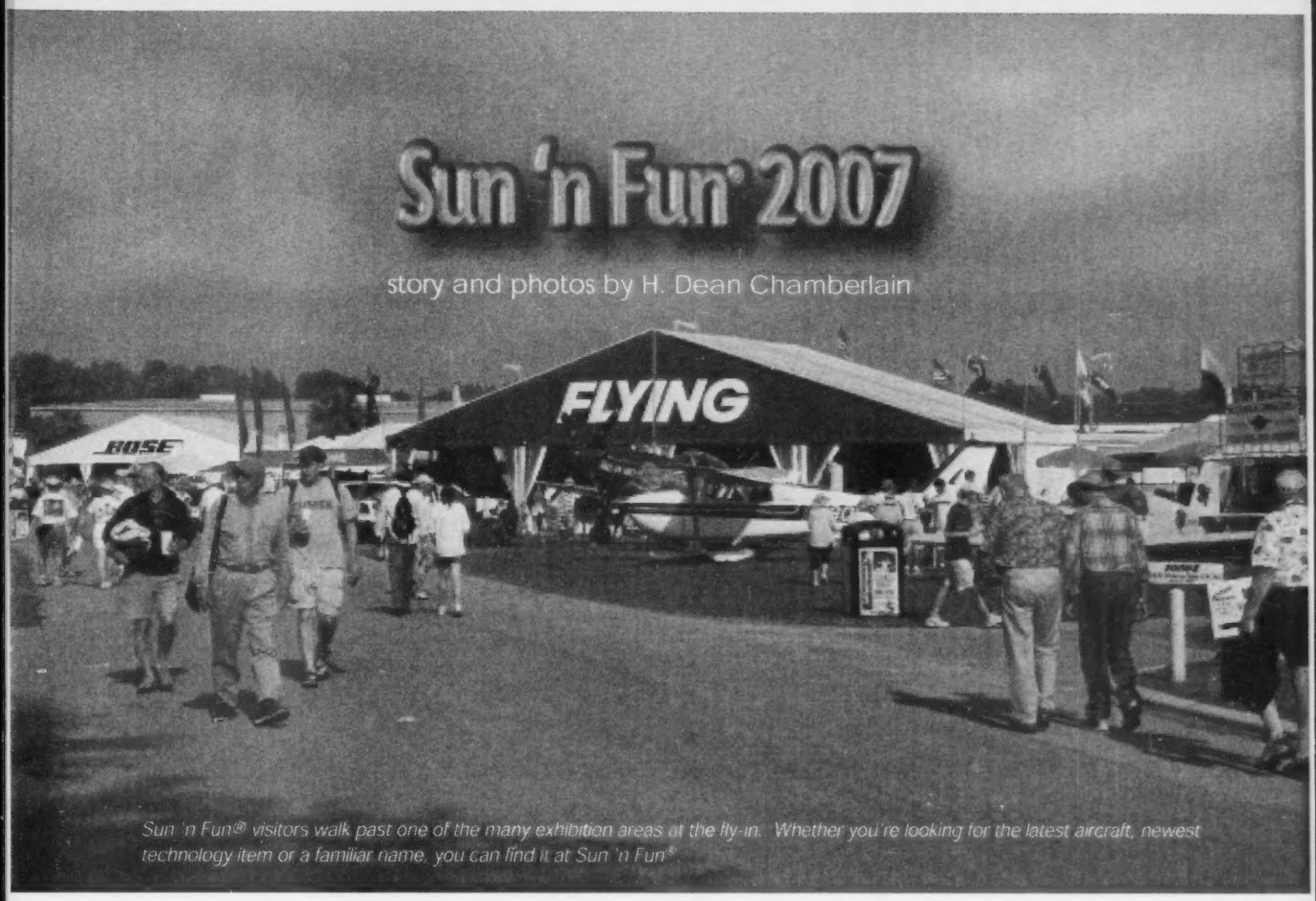
FRONT COVER: A Sun 'n Fun® visitor checks out an open-cowl Legend Cub. *This* Legend Cub *is one of the new breed of Light Sport airplanes one can see at the fly-in.(H. Dean Chamberlain photo)*

BACK COVER: Can you identify the plane in this photo taken by FAA Aviation News *photo contributor Gretta Thorwarth? Write the editor with your answer: <Dean.Chamberlain@faa.gov>.*

Sun 'n Fun® 2007

story and photos by H. Dean Chamberlain



Sun 'n Fun® visitors walk past one of the many exhibition areas at the fly-in. Whether you're looking for the latest aircraft, newest technology item or a familiar name, you can find it at Sun 'n Fun®.

Mark your calendar for fun in the sun. The dates for the 33rd annual Sun 'n Fun Fly-In™ are April 17-23. Held at the Lakeland Linder Regional Airport (LAL) in Lakeland, Florida, the theme of this year's Fly-In is "Living the Dream."

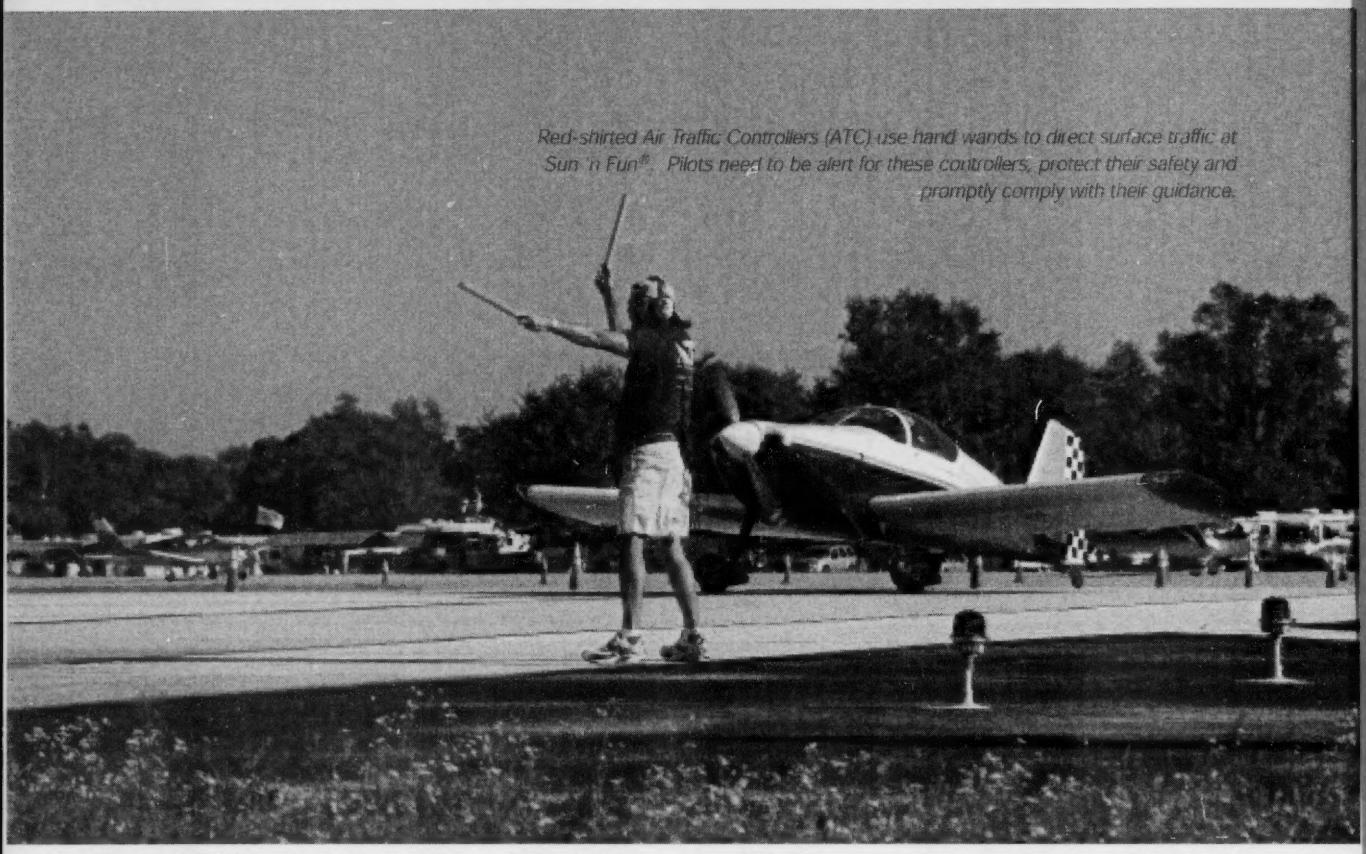
For those who have never been to a Sun 'n Fun Fly-In™, think of it as an opportunity to kick-off the 2007 fly-in and air show season with a weeklong celebration of all things aeronautical in sunny Florida. With its multitude of different type aircraft, hundreds of vendors selling or showing the latest aircraft parts and accessories, and some of the top air show pilots performing every afternoon, Sun 'n Fun® is the first major stop on the 2007 national air show circuit. There is something for everyone. If you have not made your travel plans to attend this year's Fly-In, now is the time to do it. Lodging and transportation is often reserved months in advance.

Although most of this article discusses areas of interest from the special FAA *Notice to Airmen* issued by FAA for the Fly-In, the following Internet Web sites are important for anyone planning on visiting or flying themselves to the Fly-In. For the latest information about the Fly-In you can go to the Sun 'n Fun® site at <www.sun-n-fun.org>. This is the official site for the Fly-In. It has links and information about the Fly-In, schedules, ticket pricing and purchasing, local attractions, lodging, driving directions, and other local community links. It is the single best site for the Fly-In. In addition to this link, for pilots planning on flying to the event, they can go to the FAA's North Florida Flight Standard District Office's (FSDO) home page. The FSDO page also has the Fly-In's NOTAM with its photographs of the Lake Parker VFR routing. The FSDO URL is <http://www.faa.gov/about/office_org/field_offices/fsdo/orl/local_more/sun_n_fun/>.

Once you arrive at Sun 'n Fun®, you should plan on stopping by the FAA Safety Center. From displays to safety forums, you will have a chance to find information about some of the latest FAA programs as well as a chance to listen to industry and FAA experts discuss a wide range of topics. For those who just don't have the time to visit the FAA Safety Center, you can listen to many of the forum presentations on WPEP 1510 AM-Sun 'n Fun Radio. The FAA Safety Center Forum schedule is included with this article. Please note the Forum speaker schedule is subject to last minute changes. For the latest Forum changes, you can check the North Florida FSDO Web site listed above.

NOTAM DATES

Located between Orlando and Tampa and just south of U.S. Interstate 4 (I-4), Lakeland Linder Regional Airport will have a special *Notice to*



Red-shirted Air Traffic Controllers (ATC) use hand wands to direct surface traffic at Sun 'n Fun®. Pilots need to be alert for these controllers, protect their safety and promptly comply with their guidance.

Airmen (NOTAM) in effect from April 15 to April 23 for the Fly-In. Please note this NOTAM's effective date is two days before the start of the public Fly-In date of April 17. The hours of the NOTAM are from 0700 to 2000 hours local each day through that period. As we remind all pilots each year, because of the possibility of changes from year to year, if you plan on flying yourself to Lakeland for the Fly-In, you have to have a copy of this year's NOTAM. Then you need to review it in detail and understand it well enough to be able to comply with the procedures outlined in it while flying in trail with other aircraft on the published procedure either inbound to the Fly-In or when departing. That is a long worded way of saying you will not have time to read the NOTAM in the pattern when you arrive at Lakeland. Your safety, the safety of your passengers, and the safety of those in the other aircraft depend upon you being able to understand, being able to comply with, and being able to fly the published procedures outlined in the NOTAM. If you have never attended a Sun 'n Fun Fly-In™ or flown into the airport during the event, think of it as a slightly smaller version of the Experimental Aircraft Association (EAA) AirVenture™ which is held each year in Oshkosh, Wisconsin.

PROTECT THE CONTROLLERS

I like to use the term "gaggle" when describing aircraft landing at Lakeland during the Fly-In. Living near the Chesapeake Bay area, I am use to seeing large flocks of geese and ducks flying near the Bay and feeding in the nearby farm fields. Watching a large flock or gaggle of geese inbound for a landing reminds me of the large number of aircraft inbound to Sun 'n Fun®. The only difference is geese are more maneuverable. Because of the number of aircraft flying in close proximity to each other both inbound and outbound from the airport each day, if you are not a bird, it is critical to everyone's safety that all pilots comply with the special provisions outlined in the NOTAM. An important element of the compliance is correctly following the directions from air traffic controllers at the initial airborne VFR check-in point, then along the route, those in the tower, and finally those controllers working down on the runways and taxiways in their colorful red T-shirts. Every pilot operating at Lakeland needs to watch out for the red-shirted controllers working the runways. Having spent time with the runway and taxiway controllers, the danger is real. With so many aircraft operating at once in a rather confined area, there is always the chance for a fatal error. The final section of this article highlights what can happen when a lot of aircraft are maneuvering at once. Pilots need to watch out for the red-shirted controllers as well as each other.

KNOW YOUR OWN SPECIAL PROCEDURE

Because of the number and different types of aircraft flying to and from the airport as well as those flying in the various local patterns set up especially for ultralight vehicles, helicopters, the various types of light sport aircraft, and warbirds, everyone flying in the general vicinity of the Lakeland Linder

Regional Airport needs to review the various traffic patterns for airspeeds to use, altitudes, and entry and exit points for their respective aircraft type.

The NOTAM outlines procedures for all of the types of traffic, their pattern, entry and exit points, and altitudes. In visual conditions most general aviation traffic will be expected to fly the Lake Parker VFR arrival procedure. In addition to explaining the procedure, the NOTAM contains photographs of key landmarks along the route so that pilots can familiarize themselves with what they should see when flying the route.

Air Traffic Controllers scan for inbound VFR traffic over Lake Parker for landing at Lakeland Linder Regional Airport.

COLORFUL APPROACH

When flying into the airport during the Fly-In using the Lake Parker VFR arrival procedure, pilots will have a few strange items to remember. Things like an orange water tower, a cake-shaped tower, a blue roof, and green and orange spots on the runway. These all are part of the visual arrival procedures for the Fly-In. All are explained and illustrated in the NOTAM.

NAVIGATE, AVIATE, VACATE

Last year, I visited the initial entry point air traffic control site near Lake Parker. Located at the top of the local firefighter training tower near the lake, the tower provides the controllers with a great view of the initial entry point which is Lake Parker, and a power plant along its eastern edge. Watching the controllers work, I was amazed at how some pilots seemingly had problems finding a large lake with a power plant along one side of it. Add in the fact the lake is on the edge of the city of Lakeland which is along an Interstate highway and—well you begin to get the idea. I watched one pilot fly past the lake on the power plant side going southbound seemingly obvious to the other traffic approaching the power plant and the lake from all directions. At first I thought basic navigation did not seem that pilot's best aeronautical skill. Then I thought if the pilot was simply flying past Lakeland, flying near the main entry point for the VFR arrival procedure for the Fly-In was probably not the best thing the pilot could have done if the pilot wanted to avoid a lot of conflicting traffic. Knowledge of the NOTAM would have told the pilot that Lake Parker and its power plant was an area best avoided if one was not landing at Lakeland. If I was that pilot, I would have vacated the area as fast as possible.

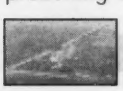
NOW "ROCK" YOUR WINGS

No, it is not a new rock and roll song. An important reminder for all pilots in the NOTAM is to only communicate with controllers when asked by a controller or in case of an emergency or a safety of flight issue develops when following the guidance for certain procedures listed in the NOTAM. For example, a controller may ask you to rock your wings when the controller recognizes you by your aircraft's make and color. The NOTAM says to rock your wings with "gusto" when acknowledging an ATC call. As explained in the NOTAM, due to the number of aircraft involved in the daily operations, the controllers want to minimize the frequency congestion in the area so that, in case of an emergency or a critical safety of flight issue, they can transmit quickly and effectively. So if a procedure says to only monitor a frequency, that is what air traffic expects you to do.

AIRPORT MANAGER'S SPECIAL CONDITIONS

The NOTAM lists special airport manager's conditions in effect during the NOTAM. The following are those conditions that apply to all pilots.

- The control tower will be open and the Class D airspace will be in effect from 0600 to 2200 hours local.
- Do not operate in the Class D airspace south of the airport. This area is reserved for use by aircraft using other authorization and procedures.
- Student training flights are highly discouraged during this event. This includes student solo cross-country flights, touch-and-go landings, low approaches, and practice instrument approaches.
- Bring your own tie down gear.



- The south side of the airport is closed from sunset until sunrise local from April 15 to 23.

CLOSED RUNWAY, TAXIWAYS, AND FACILITIES

In addition to the airport manager's special conditions, Runway 5/23 will be closed from April 13 though 25. Several taxiways will be closed. These will be marked by orange cones. The ILS and NDB/GPS Runway 5 will be shut down April 13-25. The VOR Runway 9 approach will not be available from April 13-25.

LET THE AIR SHOW BEGIN

Lakeland Linder Regional Airport will be closed daily from April 17-23 during the aerobatic demonstrations. Arrivals and departures are not permitted during the demonstrations without prior permission by the airport manager, Sun 'n Fun®, and Air Traffic Control. The demonstrations are scheduled from 1345 to 1730 hours local April 17 to 22. A night demonstration will be held on April 20 from 2000 to 2200 hours local. On April 23 the demonstration hours will be from 1145 to 1400 hours local. The demonstration area is from the surface to 15,000 feet mean sea level (MSL) within a five statute mile radius of the airport.

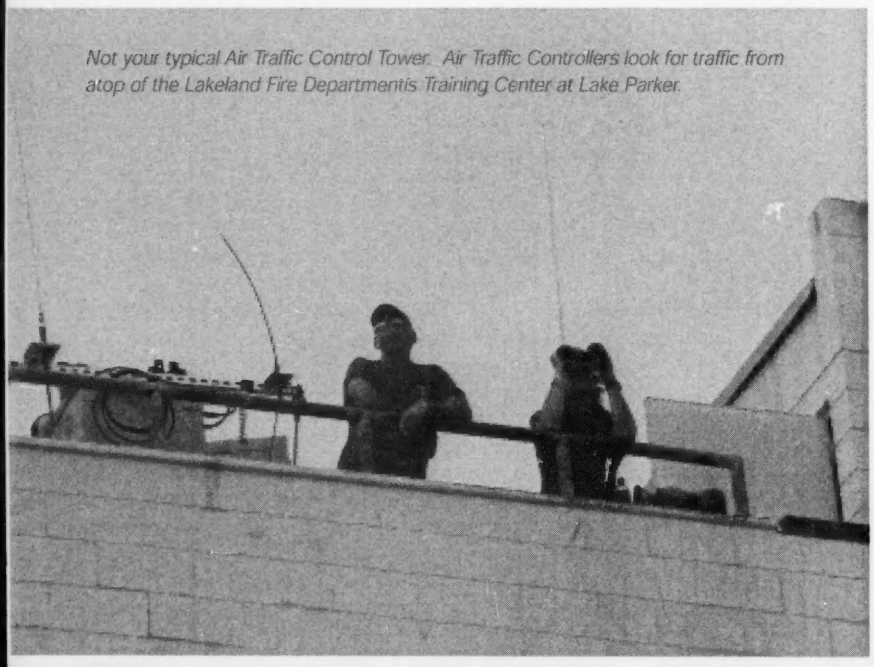
Because of the number of aircraft departures after the aerobatic demonstrations, routine arrival traffic is not accepted until 1830 hours local.

HINTS AND ALERTS

Helpful Hints

All pilots are reminded to comply with the helpful hints listed in the NOTAM. They are:

- Do not make unnecessary radio transmissions where procedures clearly state "monitor the frequency only."
- Rock your wings with "gusto" for airborne acknowledgements.
- Be observant for red-shirted air traffic controllers giving hand signals for takeoff clearances and exiting runways.
- After landing, do not stop on runways; expeditious clearing of the runway is essential.
- Do not stand on, near, or walk across runways.



Not your typical Air Traffic Control Tower. Air Traffic Controllers look for traffic from atop of the Lakeland Fire Departmentis Training Center at Lake Parker.

Parachuting Alert

All pilots are reminded that parachute activity may occur in the vicinity of Zephyrhills Airport (ZPH). Skydivers may be jumping from 13,500 feet from sunrise to sunset. ZPH is located 16.4 nautical miles (NM) northwest of Lakeland on the Lakeland VOR 332 radial.

Skydiving may also occur at the South Lakeland Airport (X49).

GENERAL INFORMATION

IFR Procedures

The NOTAM details the special traffic management procedures for IFR traffic into Lakeland Linder Regional Airport. It also lists the special IFR requirements. An IFR reservation policy is in effect during the Fly-In. The NOTAM explains how IFR reservations are made as well as the special IFR procedures outlined for the area. During this period, there are special procedures for the central Florida area. Airports included in these special provisions are Lakeland Linder Regional Airport (LAL), Plant City Municipal Airport (PCM), Bartow Municipal Airport (BOW), Lake Wales Municipal Airport (X07), Winter Haven Gilbert Airport (GIF) and Vandenberg Airport (VDF).

IFR traffic can expect a vector for a visual Lake Parker arrival when the ceiling and visibility at Lakeland is reported at or above 3,000 feet and five miles. Jet aircraft can expect vector to final to Runway 9R/27L. Pilots planning on filing IFR need to review the NOTAM for complete details on what to expect and the procedures that apply. The special IFR procedures are in effect from April 16 through 23.

IMC Taxi Procedure

When IFR procedures are in effect at the airport, the NOTAM lists the special taxi procedures that apply to all aircraft at Lakeland.

Plant City Temporary Tower

For those not familiar with the Lakeland area, the Plant City airport, which normally does not have a control tower, will have a temporary tower in operation from April 17 through 22.

Pilots flying over Lake Parker need to watch out for aircraft operating on the lake such as this float-equipped trike taxiing out for takeoff.

The hours are from 0800 to 1800 hours local each day. The airspace will be from the surface to 1,600 feet MSL within a three nautical mile radius of the Plant City airport. The NOTAM lists the frequencies, traffic pattern, and local procedures to avoid the Tampa Class B airspace and the Lakeland traffic.

Mode C Transponders And Class B Mode C Veils

For aircraft without a Mode C transponder, the NOTAM explains the procedure for requesting permission for such aircraft to transverse the Tampa and Orlando Class B Mode C Veil areas. Note: This Mode C Veil authorization does not authorize entry into the Class B airspace.

Radio Frequencies

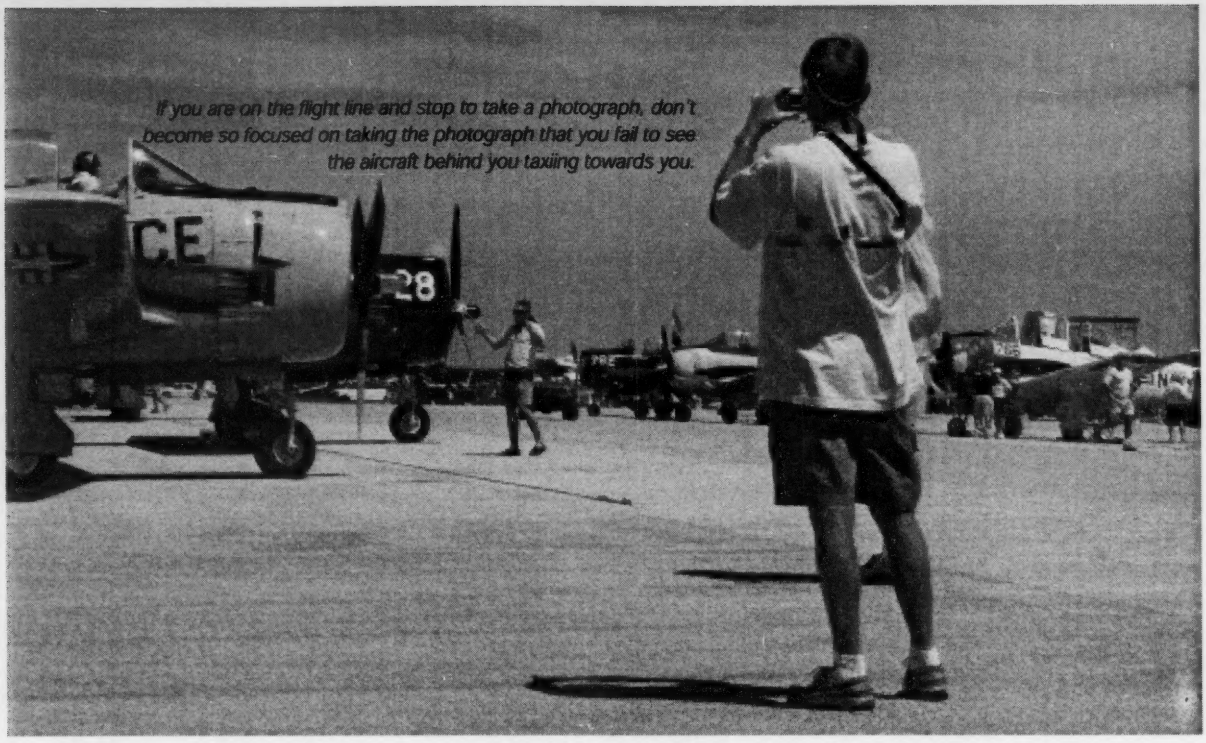
The Flight Service Station frequencies and procedures for central Florida are listed and shown in the NOTAM. Frequencies with specific altitudes are listed as appropriate. The NOTAM lists the en route air traffic frequencies as well as the various local airport frequencies.

Do You Have Your Parking Sign

Do you have your coded aircraft parking sign? If not, you might not understand the following: GAC, HB, VAC or ONC. To learn the code to expedite parking your aircraft, if you are landing at Lakeland Linder Regional during the Fly-In, you need to review the NOTAM for all of the details.

Tiedowns and General Safety Suggestions

- All aircraft need to carry their own tie-down gear.
- Park aircraft only in specified areas.
- Don't leave your aircraft until you have tied it down in its final parking spot.
- Check 121.5 MHz on your aircraft's radio before shutting down to check for any inadvertent activation of yours or a nearby emergency locator transmitter (ELT).
- Check 121.5 MHz while en route to check for any accidents. Report any ELT activation to the nearest air traffic control facility. Note time and location.
- Turn aircraft landing light on within 30 miles of Lakeland to make your aircraft more visible.
- When at least 20 miles from Lakeland, listen to the ATIS on 118.65 MHz for landing and any special instructions.
- Be alert for seaplanes operating in and out of Lake Parker.
- Remember the Tampa and Orlando Class B airspaces require air traffic control (ATC) permission for entry into the Class B airspace. Pilots are to remain clear of the Class B airspace unless authorized by ATC to enter.
- Remember, do not stand on, near, or walk across runways
- If landing at Lakeland, do not stop on the runways. You need to clear the runways as soon as possible.
- Remember, when following other aircraft, to follow in trail. No side-by-side.
- An FAA waiver has been issued reducing separation standards for Category 1 and 2 aircraft (primarily single- and light twin engine aircraft).
- Pilots are reminded to file VFR flight plans and to cancel their VFR flight plans. An additional 30 minutes time in route is suggested to be added to VFR flight plans for unexpected delays.
- VFR flight plans should include the aircraft color in the "Remarks" section.
- Pilots are requested to cancel their VFR flight plans while air-



If you are on the flight line and stop to take a photograph, don't become so focused on taking the photograph that you fail to see the aircraft behind you taxiing towards you.

borne due to the possibility of unexpected delays in parking.

- A temporary Flight Service Station (TFSS) will be operating in the FAA Safety Center at Lakeland from April 16 to 23 from 0600 to 1900 hours local. On April 24 the hours are from 0600 to 1400 hours local.
- VFR flight plans can be opened and closed with Lakeland TFSS during the Fly-In from 0600 to 1900 hours local on 122.05 MHz.

Dangers on the Ground—Story of One Fatality

Last year at the Experimental Aircraft Association (EAA) AirVenture 2006™, a passenger in a VANS RV-6 airplane was killed when a Grumman TBM-3 *Avenger* taxied into the RV-6 while both were taxiing for takeoff on Papa Taxiway, which parallels Runway 18 at Wittman Regional Airport (OSH), Oshkosh, Wisconsin. According to the National Transportation Safety Board (NTSB) Preliminary Report Aviation (NTSB ID CH106FA206A July 30, 2006), the *Avenger* taxied into the empennage and fuselage of the RV-6 killing the passenger seated in the right seat of the VANS. The pilot of the RV-6 and the pilot and passenger in the *Avenger* were not injured. According to the report, the *Avenger* pilot said he, "...never saw the airplane that he hit while he was taxiing." "The RV-6 pilot reported that he 'didn't know the TBM was behind' his airplane. Based upon the NTSB report, the *Avenger* pilot thought he was following the aircraft he could see in front of the RV-6. The *Avenger* pilot did not know or see the RV-6 airplane directly in front of the *Avenger*.

This NTSB accident report highlights the importance of being extra careful when taxiing or operating around a lot of different types of aircraft. In this case a large conventional gear (tail dragger) military warbird with limited visibility directly over the nose of the aircraft was following a small, amateur-built aircraft on a somewhat narrow taxiway. Based upon my review of the accident report, the *Avenger* pilot could not see the much smaller aircraft directly in front of his aircraft and as a result inadvertently taxied into the smaller aircraft. The report said numerous aircraft were taxiing along this taxiway to get into position for takeoff. One pilot "...reported the taxiway operation as "stop and go" traffic because of the number of airplanes taxiing for takeoff." The report said an EAA official said traffic on this portion of the taxiway is not controlled by ATC ground control or by EAA marshallers.

This accident points out the inherent dangers of operating around a large number of aircraft. The same can be said of spectators walking around aircraft or through aircraft parking areas. Because of the need to get landing aircraft off the runways and taxiways as soon as possible, there are always aircraft moving under their own power to parking areas and from those areas. In some cases, these aircraft have to move through crowds of people. Although there may be wing walkers and guides leading the aircraft through the area to parking, it is important that all spectators maintain situational awareness of what is moving around them so that they can avoid taxiing aircraft. This is especially true of young children who may not realize the danger of a rotating prop or the jet blast of a jet starting to taxi. The risks are real. And as the above accident points out, you need to be aware of what is around you at all times. The danger of a collision is just not in flight. It can happen on the ground as well.

Sun 'n Fun 2007

The FAA Production Studios
at the
FAASTeam National Resource Center
presents the
FAA Forum Schedule SUN 'N FUN 2007
"Living the Dream"

FAAST Federal Aviation Administration SAFETY TEAM

Time/Date	Tue-Apr 17	Wed-Apr 18	Thu-Apr 19	Fri-Apr 20	Sat-Apr 21	Sun-Apr 22	Mon-Apr 23
1 8:30	The Flight Review Walt Schamel 2004 ASC of the Year	Surviving Inadvertent IMC Eric Basile	Accident Investigation for TAA Mike Busch Cirrus Aircraft	Satellite Navigation Larry Oliver	Sport Aviation Larry W. Clymer FAA Light Sport Branch	Bahamas Keith Gomez Flying the Islands of the Bahamas	
2 10:00	Bahamas Keith Gomez Flying the Islands of the Bahamas	FAASTeam James E. Pyles FAASafety.gov	AOPA-ASF Say it Right! Radio Communication Mark Grady	Maintaining Your Medical Dr. Fred Tilton Federal Air Surgeon	AOPA-ASF Emergency Procedures Mark Grady	The Electronic Age IACRA Steve Brady FAA	
3 11:30 Broadcast Slot	FAASTeam Failure to Follow MX Procedures John Toy	FAASTeam Transitioning To Technologically Advanced Aircraft Buz Massengale	The Kings on Practical Risk Management John & Martha King	AOPA-ASF Bruce Landsberg	AOPA-ASF Single Pilot IFR Mark Grady	FAASTeam Experimental Aircraft Accidents Eric Minnis	Finale Ben Coleman Recap of Sun 'n Fun 2007 Airshow & Events
4 1:00 pm	Air Defense-Operation LTC Don Ayris USAF	Flying the NY VFR Corridor Doug Stewart 2004 CFI of the Year	Flight Training Sandy & Jo Ann Hill, Rusty Sachs, NAFI Tom Evans, FAFI	Meet The FAA	The Pilots and Mechanics Guide to Rotax Aircraft Engine Maintenance Phil Lockwood Lockwood Aviation	Mexico Rick Gardner Flying Mexico	

See ALL these seminars LIVE at www.faaproductionstudios.com or www.faasafety.gov by clicking on the "View Safety Seminars Live" link.

Opening Ceremonies: Tue the 17th
Forum Open: Daily, 0800

Seaplane Splash-In: Thu/Fri at Lake Parker
Night Air Show: Saturday

*Balloon Launch Briefing: Saturday, 0630

We will simulcast all or part of some of the presentations on Sun 'n Fun Radio 1510 AM Check our Web site for updates: www.faaproductionstudios.com

Look for presentations on ATN, The Aviation Training Network; GETN, The Government Educational Training Network and FAN, The Florida Aviation Network on March 12 & 19 at 11:00am Eastern and , April 17, 18, 19, 20 & 23 at 11:30pm Eastern. Meet the FAA will be at 1:00pm Eastern on Fri the 20th.

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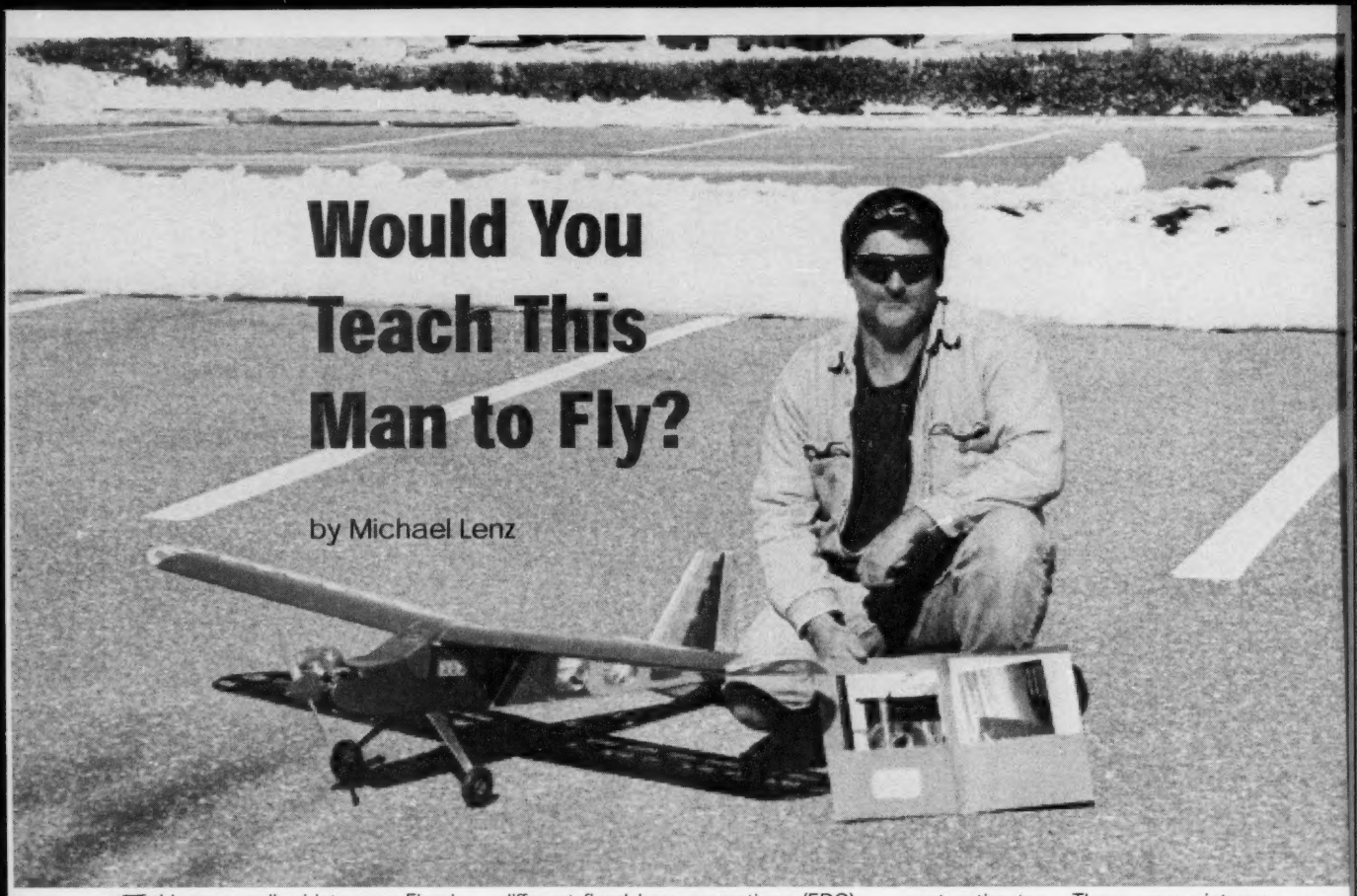


Would You Teach This Man to Fly?

by Michael Lenz

If this man walked into your Fixed Base Operation (FBO) or you were approached by him and asked if you would teach him to fly, how would you respond? Don't worry, it's a multiple choice test. Would you say:

A. "Sure. Sign here and let's get started. You brought money, right?"
B. "Take a look at these books and materials. You'll like it."
C. "Let me describe the requirements and the process for you. I'll answer any questions and then we have packet of material for you to take home for more details about learning to fly. It even contains a DVD. Of course, if you have any questions later, there's always someone here who can help you."

The answer, of course, is 'C' and the man is Brian Dean. He was on a mission to see what kind of treatment a prospective student pilot receives at different fixed base operations (FBO).

First, who is Brian and why does he want to learn to fly? Brian is a small business owner and his favorite hobby is remote control model aircraft flying. He's an electrician, so between being in a technical field and enjoying aviation through model aircraft, he seems to be an ideal candidate as a student pilot. Prior to his recent quest to explore learning to fly, he had previously checked into flying lessons, but, in his words, was "blown off" at the airport counter. So, for this story, he was told to check the phonebook and the Internet and then visit three FBO's and report on the different experiences.

And report he did!

He gave one FBO top honors. "As soon as I started inquiring, I was flat out impressed! Once I mentioned I wanted to learn to fly, it was like the world stopped, and two very nice young ladies talked to me and answered my questions. They gave me a very impressive portfolio with information on the basics of ground school, flight lessons, and time and cost estimates. There were pictures of typical training aircraft. It was comprehensive. They spent 10 or 15 minutes with me. It sucked me in like a shop vac." His overall rating of the service and treatment was a very enthusiastic 101 out of a possible 100. (No letters, please. We can do the math, too!)

His response at another airport was not as impressive, but adequate. A 70 out of 100 on the "Brian - Learn to Fly" scale. Here, a helpful fellow was "pretty informative." Brian was given a business card and they showed him the student pilot training materials, books, and tools. He didn't get anything substantial to take home, however. He said the gentleman did everything that he could with what he had to show him. He spent about five or six minutes with him and pointed out the training aircraft that were available. He said Cessna 152's could be used, but recommended upgrading to the larger Cessna 172's for comfort. It was also "smoother."

He offered to schedule a "Discovery Flight," so Brian could see if he

liked it. He said that would take about an hour. Brian was told, "We'll come back after the flight and go over things, and if you like it, we can go from there." The total cost to earn a private pilot certificate would be $6,000 or $7,000. The gentleman concluded with offering that there was always someone on call if he needed more information.

The third airport was one that Brian had previously visited, when he was exploring learning to fly on his own and was "blown off." Unfortunately for business there, things hadn't changed much. Here, Brian felt the body language and demeanor was telling him, "If you've got the cash, we'll hook you up. I didn't have $100 dollar bills sticking out of my pockets, so they helped me and moved on to other customers."

What the Industry and User Groups Say

AOPA's Project Pilot

Sue Walitsky, who heads up the Aircraft Owners and Pilots Association (AOPA) Project Pilot program was told of Brian's experience with these three FBO's. She said sometimes the response you get is driven by the weekday/weekend choice for the visit, or simply the time of the day and who happens to be available on staff to provide information.

"Face-to-face is a great way to do it," according to Sue, but she adds, "It's best to find a pilot friend to bring you to the FBO and break the ice." "A friend can also help you through a complex maze of flight schools that vary from Mom and Pop operations to nationwide operators. This provides the prospective student with lots of choices for flight training,

The downside is that the new student pilot can become frustrated and confused over so many options. If a pilot friend—who knows you and knows a couple FBO's—is willing to break the ice for you, take advantage of it. It can make all the difference in getting started on the right track. Sue adds. "It's important to do some homework first. If you don't, you won't know what questions to ask."

Sue suggests that prospective students who don't know any pilots, can use <http://flighttraining.aopa.org/projectpilot/>, then click on the Students "Get Started" icon. Here students can find and contact a volunteer mentor. Sue cautions that these mentors do not take the place of a flight instructor, but rather compliment the flight training process. Sue proudly pointed out, "The record for mentors speaks for itself, with a student pilot being three times more likely to earn a private pilot certificate when using a mentor!"

GAMA's Thoughts:

The General Aviation and Manufacturers Association's (GAMA) Director of Communications, Katie Pribyl, echoed AOPA's comments on mentoring. Katie agreed. "It's a big decision and learning to fly is expensive, as well as time consuming. It's important to find the right flight school and flight instructor. It's good to talk to pilots and people who have been involved in the industry."

Katie expressed GAMA's concern that student pilot starts are down and, for the first time in several decades, the total number of pilots has fallen below 600,000 in the U.S. "GAMA finds this alarming! We also have noted that the average age for pilots is 46. Programs like AOPA's Project Pilot, GAMA's Be A Pilot and the Experimental Aircraft Association's Young Eagles Program help to build excitement about learning to fly."

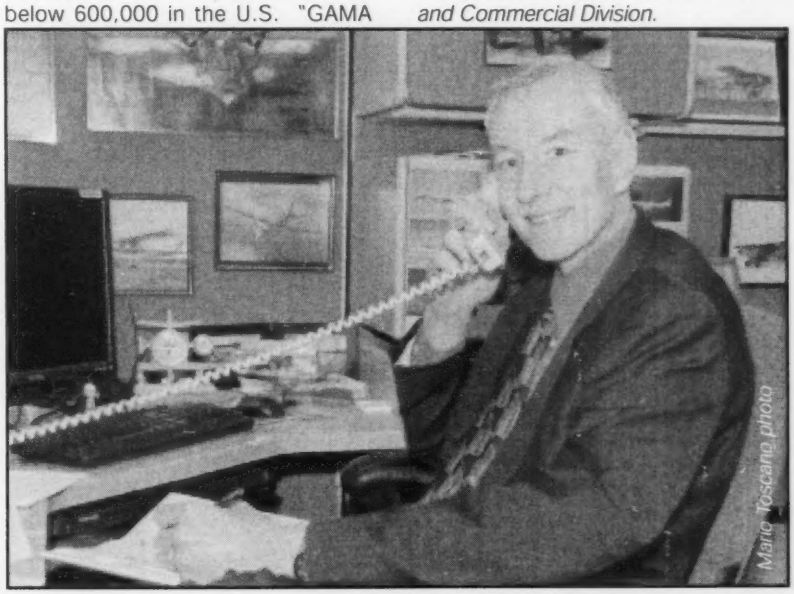
GAMA is encouraged and hopeful over light sport aircraft (LSA). Katie reports, "The first 1,000 Sport Pilot certificates have been issued over the past year and a half. We're also seeing an important trend in an increase in the use of piston aircraft flown by owner/renter pilots on business trips."

If you're interested in learning to fly, the Internet and the phone book will offer you choices beyond those mentioned here. Try to use a mentor, as it can make all the difference in learning to fly.

If you're already a pilot, consider mentoring someone, and always welcome a non-pilots questions and interest in aviation. Taking a few minutes with a stranger who questions you at the airport could mean one more new student pilot and that stranger may be the one who puts the number of U.S. pilots above 600,000 once again.

+

Michael Lenz, pictured below, is a Program Analyst in the FAA's Flight Standards Service's General Aviation and Commercial Division.


Mario Toscano photo

Beyond the Buttons:
Mastering Our Marvelous Flying Machines

story and illustrations by Susan Parson

Once upon a time, every office had a simple, practical machine called a typewriter. It took a little time to learn the basics of the QWERTY keyboard, but mastery of the machine was still a straightforward mechanical matter. Then along came progress in the form of computer-based "word processing." The computerized word processor could do much more than the humble typewriter....but it took longer to learn, and document creation was no longer a simple matter of typing in Pica or Elite. Instead, we had to learn to manage information, make the automation obey our wishes, and cope with the unintended consequence of seeing easier changes (anybody still remember White-Out?) lead to more changes. Nay-sayers abounded, but resistance to computerized word processing was ultimately futile. We have all been assimilated.

So what does office technology have to do with aviation? More than you might think, because a similar technological transition is occurring in the general aviation world. The simple six-pack of round gauge instrumentation is rapidly losing ground to the sleek and shiny new world of glass cockpit avionics that "boot" rather than "start." As with word processing programs, it takes longer to learn to fly these planes. However, their systems can do a lot more for the pilot. In fact, for pilots schooled in the traditions of stick-and-rudder for the basics and needle/ball/airspeed for instrument flying, it may still feel a bit like "cheating" to relinquish so much of the traditional piloting workload to a computer. What these pilots may not recognize is that accepting help on mundane tasks, such as keeping the wings level, gives them more time to spend on important decision-making tasks, like evaluating weather and considering alternatives. Those who invest the time and money to truly master glass cockpit aircraft will find that they have a lighter workload.

What does it take to be pilot-in-command of a glass cockpit aircraft? Just as the advent of word processing technology taught us that the mechanical mastery of the QWERTY keyboard was necessary but not sufficient, the rapid rise of glass cockpit avionics is showing us that pilot skills for both normal and emergency operations must include not just mechanical manipulation of stick and rudder, but also the mental mastery of three key flight management skills: information management, automation management, and risk management. Let's take a look.

Information Management

One of the axioms of aviation training is that the volume of information presented is akin to drinking from a fire hose. Pilots making their first acquaintance with glass cockpit avionics can fervently relate: the primary flight display (PFD) and multifunction display (MFD) screens are chock-a-block with information, colors, menus, and sub-menus. There is so much to see that a new glass cockpit pilot can easily be drenched in data, but still thirsty for useful knowledge (e.g., how to find a specific piece of information).

The foundation of glass cockpit information management is to understand the system at a conceptual level. In the Garmin G1000™, for example, information is organized in "chapters" and "pages" that are identified in text at the top and by symbols at the lower right of each "page." Also, the pages in the "waypoint" and "nearest" chapters are presented alphabetically, so you will find the "airports" page before you get to "user waypoints" or "VORs." Remembering how your system is organized can you help you manage the sheer volume of available information. It is also far more effective (and far less frustrating) than attempting to memorize mechanical manipulation of the knobs. Simulation software and books on the specific system you are learning can be of great value in this effort.

The next critical information management skill is to recognize that reading is fundamental. Understandably enough, pilots new to glass cockpit avionics often become fixated on the "knobology," to the point of believing they must memorize each and every sequence of button pushes, pulls, and turns. Not so. Though human beings are notorious for our reluctance to read the directions, a far better strategy for accessing and managing the information available in glass cockpit computers is to stop, look, and read. Both the Garmin G1000™ and the Avidyne™ displays have clearly labeled buttons, knobs, and "softkey" menus. Reading before you push, pull, or twist can often save you some trouble.

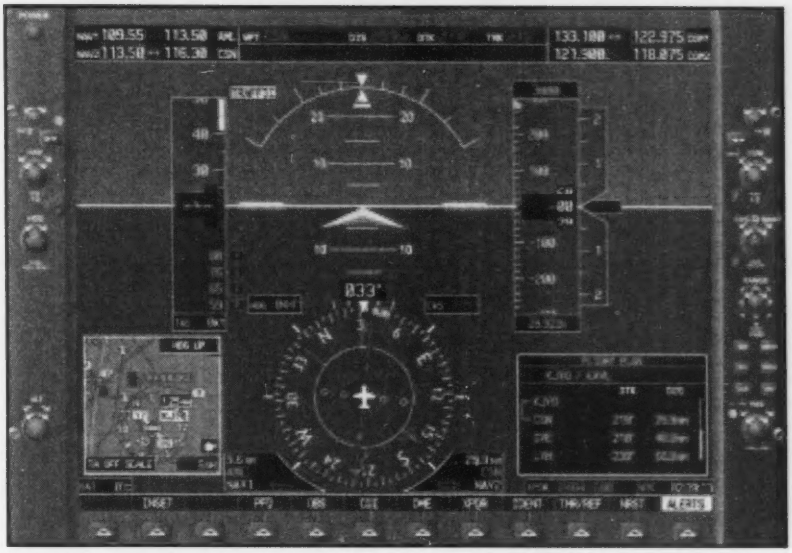
Once you are actually behind the display screens on a glass cockpit aircraft, your goal is to meter, manage, and prioritize the information flow to accomplish specific tasks. Whether you are an instructor or a pilot transitioning to glass cockpit avionics, you might find it helpful to direct the fire hose flow of information into a few conceptual "drinking glasses" like these:

Personal preference. You might remember "have it your way" as an old

fast food advertising jingle, but the concept definitely applies to setting up the displays in a glass cockpit aircraft before you fly. Just as you can configure your personal computer display to suit your individual preferences and styles, you can set up many aspects of the glass cockpit PFD and MFD screens in the way that works best for you. An obvious example is map orientation. Most systems offer options that generally include "north up," "track up," "DTK" (desired track up), and "heading up." Being a "heading up" fan myself—saves me from turning my charts upside down—map orientation is one of the first things I check.

To a large extent, you can also have it your way in terms of how much (or how little) information you display. I don't like clutter on my desk, but I do like a lot of information on the PFD. In Garmin G1000™ equipped aircraft, for example, I always configure the PFD to show the inset map with the "topo" and "traffic" overlays, the Nav1 and Nav2 bearing pointers (tuned, of course, to useful frequencies), and the flight plan inset. I also make sure that the "V-speed" bugs for the airspeed tape are selected on. On the MFD side, I check and, as needed, adjust the fields on the waypoint status bar to suit my needs for the specific flight.

Specific operation. The "just in time" delivery system has become commonplace in the manufacturing world, and glass cockpit avionics put this concept to work for the general aviation PIC and flight manager. You now have the ability to prioritize information for "just in time" display of just exactly the information needed for any given flight operation. In Avidyne™ equipped aircraft, for example, system start begins by prompting you to set the appropriate fuel level. A good information management practice is to put the comprehensive engine systems status page (rather than the moving map) on the Avidyne™ MFD for taxi, takeoff, and initial climb, because engine status information has much greater utility and value to you during these critical phases of flight. A



few other examples of managing information display for a specific operation include:

- Map scale settings for en route versus terminal area operation.
- OBS mode to set up a "random" (non-published) holding pattern in GPS.
- Terrain awareness page on the MFD for a night or IMC flight in or near the mountains.
- Nearest airports inset on the PFD at night or over inhospitable terrain.
- Course deviation indicator (CDI) sensitivity for en route, terminal, approach.
- Weather datalink set to show echoes and METAR status "flags."

Situational awareness. Aircraft flight manuals explicitly prohibit using the moving map, topography, terrain awareness, traffic, and weather datalink displays as the primary data source, but these tools nonetheless give the pilot unprecedented information for enhanced situational awareness. Without a disciplined information management strategy, though,

these tools can also make it easy for an unwary pilot to slide into the complacent role of passenger-in-command. For example, a pilot, whose navigational information management strategy consists solely of following the magenta line on the moving map, can easily fly into geographic or regulatory disaster, if the straight-line GPS course goes through high terrain or prohibited airspace, or if the moving map display fails (yes, it can happen.) Remember also that GPS is a supplemental system.

Your strategy for situational awareness information management should have several components:

- Always double-check the system. At a minimum, ask yourself whether the presentation makes sense. I once programmed a moving map navigator to take me to Augusta, Maine (KAUG) when I wanted to go to Augusta, Georgia (KAGS)—big difference. Because I was so enthralled with the fantastic capabilities of my new gizmo, I'm ashamed to say that it took me awhile to catch the mistake. Lesson learned. If your aircraft is equipped with weather datalink, you must remember that you are looking at recent weather, not real-time radar returns, and take note of the weather data "age" legend on the MFD. It sounds easy and obvious on the ground, but pictures are surprisingly and powerfully persuasive.

- Use callouts. One of the information management techniques I now teach for situational awareness in glass cockpit aircraft is callouts – even for single pilot operations. Specifically, I ask pilots to read the appropriate displays (e.g., PFD, MFD, autopilot status annunciator) out loud after making any change in course or altitude. Callouts for what is expected next (e.g., next fix, next altitude) are useful as well. This practice helps you make the most of your situational awareness gadgetry, while keeping you firmly in the role of pilot in command. It's also a great way to catch your programming mistakes before they catch you.

Automation Management

Glass cockpit aircraft are highly automated. While most include some kind of automatic flight control system, otherwise known as the autopilot, "George" is not the only piece of automation you need to manage in order to avoid the potentially dangerous distractions of "automation surprise." For example:

CDI sensitivity. By default, the course deviation indicator (CDI) needle is set to scale its sensitivity automatically for the appropriate flight operation. During the en route phase (more than 30 nm from the destination airport), the G1000™ electronic Horizontal Situation Indicator (e-HSI) provides an "ENR" annunciation to tell you that a full-scale CDI deflection puts you at least five nm from the desired course. Within 30 nm of the departure or destination airport, CDI sensitivity switches automatically to "TERM" mode, in which a full-scale CDI deflection indicates at least one nm from the desired course. Within two nm of the final approach fix, CDI sensitivity scales to "APR" mode, in which a full-scale CDI deflection indicates at least 0.3 nm from the desired course. If, however, the pilot who flew before you decided to disengage the automatic CDI scaling feature, would you know how to recognize the change? (Hint: If you see a numerical value on the e-HSI instead of one of the three notations for ENR, TERM, or APR, your system is not using the default settings.)

Navigation source. In the Garmin G1000™, loading an ILS or LOC instrument approach procedure while navigating by GPS causes the system (by default) to automatically locate, identify, and install the LOC course in the Nav1 frequency box, and slew the Nav1 OBS to the final approach course. Also by default, the system is configured to automatically switch the active navigation source from GPS to Nav1 on an ILS or LOC approach. While these features can certainly ease your workload at a busy time, it is extremely important that you know what to expect, monitor for proper operation, and promptly take appropriate action if the system doesn't perform as you expected.

Autopilot. At the most basic level, managing the autopilot means knowing at all times which modes are engaged, and which modes are armed to engage. You need to verify that functions you have armed (e.g., nav tracking or altitude capture) do engage at the appropriate time. Automation management is another good place to practice the verbal callout technique, especially after commanding (or arming) the system to make a change in course or altitude. When teaching in these aircraft, I now require pilots to read the display out loud, even (or perhaps especially!) for single pilot opera-

tions. In the Bendix/King KAP 140 illustration on page 12, for example, the callout might be as follows:

> *Heading mode is ENGAGED, and aircraft is following the heading bug on the e-HSI to intercept the desired course. Altitude hold mode is ENGAGED to maintain pre-selected altitude of 4,500 MSL. Navigation mode is ARMED to capture the desired course upon intercept.*

In glass cockpit aircraft, proper automation management also requires a thorough understanding of how the autopilot interacts with the other systems. With some autopilots, for example, changing the navigation source on the e-HSI from GPS to LOC or VOR while the autopilot is engaged in NAV (course tracking mode) will cause the autopilot's NAV mode to disengage. The autopilot's lateral control will default to ROL (wing level) until the pilot takes action to reengage the NAV mode to track the desired navigation source.

Let's look at an example. After the pilot activates an ILS or LOC instrument approach procedure, the G1000™ system defaults are set to switch the navigation source automatically from GPS to the Nav1 localizer frequency as the plane approaches the localizer. You could be in for a potentially dangerous "automation surprise" if you have one of the autopilot's navigational tracking modes (NAV, APR, or REV) engaged when the system automatically switches the navigation source, especially if you fail to notice that the system is no longer tracking the desired course. To ensure that you remain ahead of the airplane and fully in charge of your glass cockpit systems, you need to understand, anticipate, and manage such functions (e.g., by first manually switching the navigation source and then engaging the autopilot's APR mode).

Risk Management

The last, but by no means the least, of the three flight management skills needed for mastery of the glass cockpit aircraft is risk management. There is no question that the enhanced situational awareness and automation capabilities offered by a glass cockpit airplane can vastly expand its safety and utility, especially for personal transportation use. At the same time, there is some risk that lighter workloads could lead to the cliché of "fat-dumb-and-happy" complacency. Just remember that any glass cockpit pilot tempted to relax into a passenger-in-command role is likely to find some very sharp corners in all this cutting edge technology. As with any piece of glass, you must always handle it with care.

It is especially important to recognize that there are limits to what the systems in any light general aviation aircraft can do. To help pilots remember this point, some Avidyne™ equipped aircraft now offer a risk management checklist page that the pilot must acknowledge before continuing to program the system. Whether or not your aircraft is so equipped, just remember that being pilot-in-command always requires sound aeronautical decision-making (ADM), and that it sometimes means saying "no" to a flight you really want to take. Here's a recent personal example, using the PAVE risk identification checklist:

Pilot(s): On a recent winter evening, I planned a night cross-country flight with a fellow G1000™ instructor. Both of us are night current, instrument current, and fully proficient in use of the G1000™ systems.

Aircraft: The aircraft was a G1000™ equipped, single engine airplane with the full weather datalink package installed.

enVironment: Weather at the proposed time of departure was still VFR, but visibly deteriorating to marginal VFR and forecast to be IFR approximately two hours after completion of the trip, which was along a well-known route to a familiar airport. Temperatures aloft for the proposed altitude (which would put us in the clouds) were just above freezing. The intended route of flight included short segments over mountainous terrain.

External pressures: We really, really, really wanted to fly!

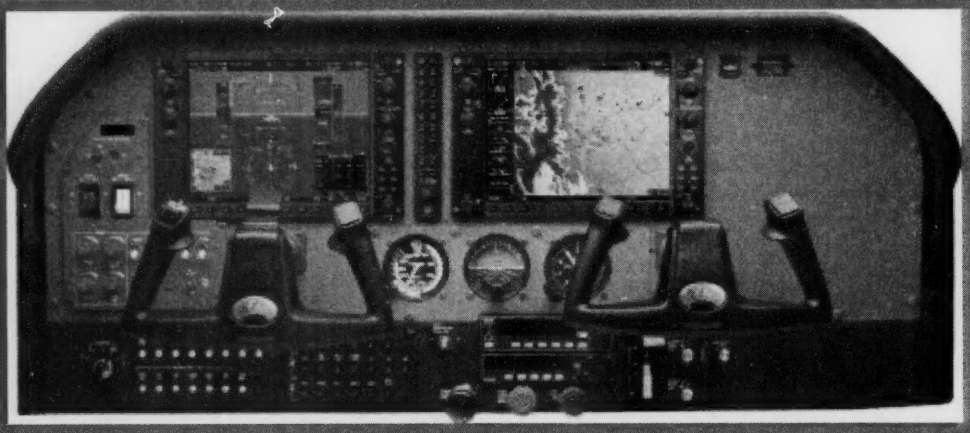
After watching the ceiling and visibility decline noticeably during the preflight inspection, we quickly lost faith in the forecast. Despite the proficiency of the pilots and the capability of the aircraft systems, the two of us reluctantly concluded that the risk posed by a night flight over mountains in instrument meteorological conditions (IMC) with possible icing was well beyond the limitations of a light single-engine airplane—and we lived to fly another day.

Beyond the Buttons

Even the most reluctant converts will probably agree now that the convenience of computerized word processing made it well worth the effort to learn new skills. Similarly, pilots, who invest the time needed to master information, automation, and risk management challenges of the glass cockpit aircraft, will benefit immensely from the enhanced potential for safety and aircraft utility. Prepare to be assimilated!

Susan Parson is a special assistant in Flight Standards Service's General Aviation and Commercial Division.

TECHNOLOGY IN THE COCKPIT



A Cessna 182 cockpit with a Garmin G1000™ flight deck. (Garmin photo)

The Future is now and you'd better catch up!

by James Williams

I started learning to fly only about eight years ago. At that time glass cockpits were something for those aluminum tube jockeys at the flight levels. The idea of a basic training aircraft with a Horizontal Situation Indicator (HSI) much less a Primary Flight Display (PFD) was laughable. The only Global Positioning Systems (GPS) around were small (relatively), VFR only, portable units with black and white or single color displays. Times were good and I learned how to navigate the hard way—something that has come in handy on a few occasions. After I finished my Instrument rating I figured I needed to know how to use these new systems. I had used portable VFR GPS before, but my training center now had the holy grail of general aviation (GA) navigation, aircraft equipped with color moving map IFR certified GPS. They were Garmin GNS 430®. I quickly learned the basic functions of the Garmins and learned to love the system as a giant leap forward in navigation. I am still grateful that I learned to fly and navigate the traditional ways, though, because they have proved useful and taught me not to depend on a single source of navigation information.

The point of the preceding tangent was to illustrate just how rapid the rise of technology has been. I was probably one of the last pilots to be trained in an environment where GPS for instrument flight was still a relatively far off dream. Within a year or two of my start, IFR GPS was so prevalent that students would complain if they had to do a VFR cross country without GPS. I was happy to get a plane with two radios and distance measuring equipment (DME).

If you think this technology revolution has happened overnight you're at least partially right. To me it certainly seems like the advance has been more rapid than we could have possibly dreamed just 10 years ago. But with that advancement comes a new challenge—keeping up. If you're like me, you don't get to fly as often as you'd like. Maybe you do fly a lot, but not in an airplane with any of these new technologies. So you're sitting there scratching your head asking what any of this has to do with you. Well, it's a brave new world, and we as aviators all have to live in it. Besides, many of these systems really do provide benefits over the older ones, if you just take a little bit of time to learn them.

TECHNOLOGY REVOLUTION

Let's take a brief look at three main areas of the technology revolution: navigation information, weather in the cockpit, and Automatic Dependent Surveillance-Broadcast (ADS-B). You can look at these technologies as past, present, and future. While these titles may be a bit forced, they frame the point where we currently are in this revolution. Navigation information mainly in the form of GPS is the revolution that was. While not completely adopted, mainly because of cost of installing and maintaining current systems, most pilots have at least used an IFR certified GPS and would acknowledge it has become the dominant form of navigation for general aviation.

Weather in the cockpit is the revolution of the present. Right now there is technology available that will allow datalink systems transmit real time or near real time weather information, even radar, onto the screens of GA

aircraft. While these systems will probably not replace weather radar, they offer a near approximation at a vastly reduced cost.

ADS-B is the revolution to come. FAA Administrator Marion C. Blakey has called it the "FAA's moon-shot." ADS-B is a new system to augment and in part replace traditional radar and improve air traffic control capacity and safety. By looking at all three areas we can see what has happened, what is happening, and what will happen.

The underlying advance that makes all of these things possible (or at least much more usable) is the introduction of LCD cockpit displays. The most often overlooked advantage of LCD screens is that they are software driven. Software driven systems displays or instruments can be adjusted or upgraded without replacing the entire unit. In many cases just a quick software patch is all that is required. From a human factors perspective this is great. Traditional instruments are very limited in the ways they can present information to the pilot. Any change requires a hugely expensive replacement or at least extensive modification of the instrument. In the future, LCD displays could lead to completely customized displays for every pilot. Much the way many cars now have memory positions for the seats and controls, airplanes could automatically adjust the displays of systems and other information to what pilots select as their favorite. These settings could be stored on a memory stick or USB key and transferred to any like-equipped airplane. The settings could also be tailored to phase of flight as well and change automatically at preset points on a flight, always presenting the pilot with the most relevant information for a particular phase of flight without overloading him/her. These are some of the possibilities opened up by the new technology.

An Avidyne® Multifunction Display (MFD) displays an approach procedure. (Avidyne® photo)

With these new systems come new challenges—a familiar aspect of this modern age. These systems are a massive advancement over their predecessors, but that said they can be very complicated. In general aviation we have a tendency to try to learn on the fly. With systems as complex as those now becoming prevalent in GA, this is no longer an acceptable practice. Ground training should be undertaken to gain a better understanding of how these systems work and how to get what you need out of them. We can no longer just figure it out as we go along.

NAVIGATION INFORMATION

Navigation Information has probably made the most complete inroads to our system. Today GPS is widely accepted as the preferred method of navigation for most pilots. It's quick, it's easy (relatively), and it's widely available. We often forget that GPS is not approved as a primary method of navigation. So remember, you still need to have a primary means of navigation onboard and active. [See our article on Instrument Flight Rules requirements from the November/December 2006 issue for more information, which is available online at <http://www.faa.gov/news/aviation_news/2006/media/NovDec2006.pdf> Page 13.] Plus in different ways it lays the ground work for the other two portions of this revolution. Before the introduction of GPS for civilian use in 1993 (*Aeronautical Information Manual* (AIM) Chap.1-1-19) no major advances had been made in navigation methods since the introduction of Very High Frequency (VHF) Omni directional Ranges (VORs) and Instrument Landing Systems (ILSs) following World

War II. While systems like Microwave Landing System (MLS) and Long Range Aids to Navigation (LORAN) had been developed, they never gained wide acceptance. In the case of MLS, this was a matter of cost and complexity. In the case of LORAN, it was a matter of coverage and usability. GPS is the one that made it. Its use is so widespread that not having it today is seen as a serious shortcoming by many pilots.

In fairness I must say there has been much discussion in recent months of what to do with LORAN and there are some good arguments for retaining it as a back up to the GPS system. Recently a request for comments was published in the *Federal Register* (Vol. 72, No. 4 and available at <http://a257.g.akamaitech.net/ 7/257/2422/01jan20071800/edocket.access.gpo.gov/2007/pdf/E6-22421.pdf>. The Coast Guard is trying to determine whether to continue funding the system, scrap it, or improve it. As we look to the future we must ensure that we have redundancy built in the next system like we do in this system. Using only GPS would create a rather large single point of failure and this is the problem that is being worked on by those who design the modernization plans.

These technologies, especially ADS-B, play parts in the Next Generation Air Transportation System (NGATS) proposed by the FAA and the Joint Planning and Development Office (JPDO). The JPDO is a group made of different federal agencies and private companies that was tasked with developing the NGATS. The NGATS should provide some dramatic benefits to all users. "With precise performance-based navigation and Internet-like access to critical information—including nearly real-time weather—pilots will make precision landings at airports that do not have control towers, or radar, or Instrument Landing Systems...," said Nicholas A. Sabatini, Associate Administrator for Aviation Safety. For a detailed description of the NGATS, you can visit <http://www.jpdo.aero/NGATS_v1_1204.pdf>.

The Garmin GPS map 496® offers many features, but it is not certified for IFR use. (Garmin photo)

GLOBAL POSTIONING SYSTEM

GPS works by calculating the aircraft's position by measuring the time messages transmitted from a constellation of satellites take to reach the aircraft from a known position in space. With five satellites in view, GPS can resolve positions to within about three meters. Only three satellites are necessary, but the fourth allows for greater accuracy and the fifth is used to monitor signal quality and availability. The GPS constellation contains at least 24 satellites arranged in a manner that should allow six to be visible from anywhere in the world. All this electronic wizardry had a huge effect, especially for general aviation. Airlines already had expensive and complicated inertial navigation systems that allowed for similar navigation performance, but these systems are too costly for most general aviation customers. GPS changed the world of GA almost overnight. Suddenly you could go direct to anywhere. No more airways, VORs, and Non Directional Beacons (NDB)! Well, that never really happened, but within a few years of the first VFR GPS units hitting the market came panel mounted units that were approved for IFR navigation. Then came GPS approaches. These non-precision approaches offered access to airports that previously had none or increased access to airports that had traditional ground-based equipment. The original GPS approaches were no replacement for the ILS which was still required for use in the worst weather.

Significant progress toward ILS type approaches by GPS was made in 2003 when the Wide Area Augmentation System (WAAS) came online. More broadly, WAAS is part of what the industry calls SBAS or Satellite Based Augmentation Systems. These systems use ground stations with known positions to correct inherent inaccuracy in the GPS process. These stations send a correction factor to a main station which gathers them from all the ground stations and sends them to satellites. These satellites then broadcast them back down to the aircraft allowing it to correct for the errors in the signal and navigate even more accurately. There are also sys-

tems that use the same concept without satellite distribution, instead relying on radio transmission. These systems are known as GBAS or Ground Based Augmentation Systems. Australia currently uses a GBAS for upgraded accuracy. With WAAS in place, vertical guidance was initially available down to 350 feet. After further development localizer quality lateral guidance and vertical guidance to 250 feet became available. The FAA expects to have vertical guidance down to 200 feet available sometime this year. Of course, all of this assumes your GPS receiver is WAAS capable and properly certified and installed. Air Services Australia is about to field Category I approach capability, which allows vertical guidance down to 200 feet, based on GPS information in the very near future. In any case, no rational pilot can deny that GPS dominates any discussion of airborne navigation.

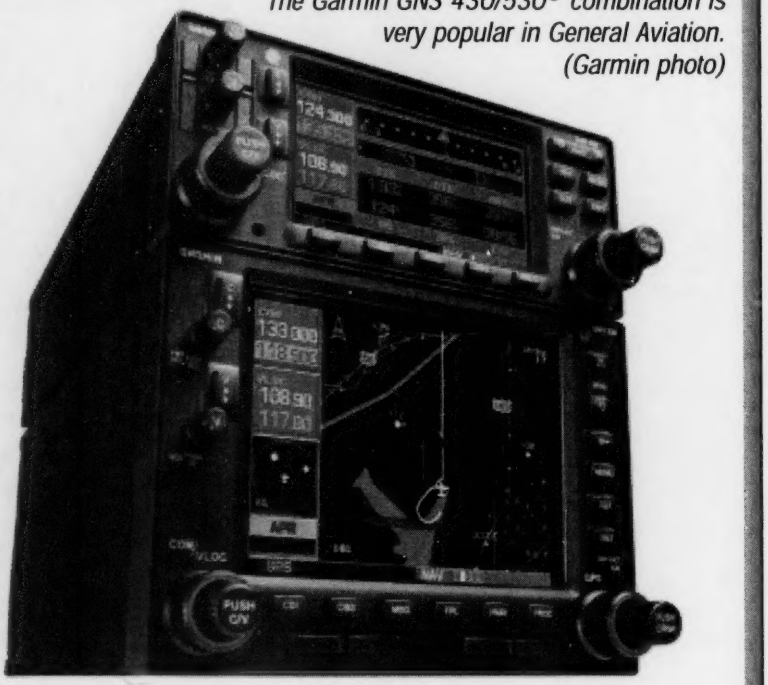
WEATHER INFORMATION IN THE COCKPIT

Once GPS and electronic displays started to become a fixture in general aviation cockpits the door was opened to more advances. As the screens got bigger and cheaper you could do more with them. There was room for more than just the absolutely necessary information. The appearance of these displays lead to weather information in the cockpit. Ask any pilot what factors most worries him or her about flying and weather will be very high up the list—if not at the top. Weather can be a joy or a rude slap in the face. Most conscientious pilots dutifully call Flight Service before flights to check the weather or at least stop by the weather computer or TV at the FBO for a quick glance at the local radar. In most cases, before they enter the cockpit is the most informed about the current weather pilots will ever be. There are good resources out there for checking the weather in-flight like Flight Watch or Hazardous In-flight Weather Advisory Systems (HIWAS) reports and, of course, Flight Service Stations, but for as long as we've had radios they have been limited to describing conditions.

Avidyne® Entegra MFD offers many features including weather overlay. (Avidyne® photo)

From personal experience even when you are really keen to learn about conditions, sometimes these aids aren't all that helpful. HIWAS in particular can be difficult because it defines warning areas in terms of points from navaids. In many cases, when you're traveling cross-country, they are navaids you've never heard of. So now you have to flip through your charts looking for a point 40 miles southwest of the Apple Bumpkin VOR and all you're thinking is where am I and who names a VOR Apple Bumpkin? (Hint: I made this VOR up, at least I hope so.) So you're left madly rifling through charts wondering if that magical VOR is on this chart or perhaps the next or perhaps it's in Guam, you never can tell with these things. The point is that the limitations of voice communications make it difficult to rapidly determine what the situation is. There is an assumption of local knowledge which just isn't always true. Technology to the rescue, in the form of weather in the cockpit displayed in glorious color on moving maps. You can now rapidly ascertain the weather situation that surrounds you.

The satellite datalink technology allows for many kinds of updated information to be downloaded directly to your display during the flight. Products available include Routine Aviation Weather Reports (Metars), Terminal Area Forecasts (TAFs), Airmets, Sig-



The Garmin GNS 430/530® combination is very popular in General Aviation. (Garmin photo)

mets, Pilot Reports (Pireps), Temporary Flight Restrictions (TFRs), NexRad Radar, and more. While datalink can't replace weather radar or the Aircraft Communication Addressing and Reporting System (ACARS) on larger aircraft for those of us not regularly flying the flight levels, it's close enough. The cost makes it affordable whereas a dedicated weather radar would be a proposition that would not be feasible. Looking back at some of the trips I've made, I really wish I had this technology to help make decisions. Two of the major players in the weather in the cockpit market for GA are WSI Corporation and XM WX Satellite Weather. The features vary slightly, but both systems work through existing navigation systems or Electronic Flight Instrument Systems (EFIS) currently available.

Now for the bad news, these systems rely on datalink and as such there are delays. NexRad provides updates every five minutes and most systems update every 10 minutes. There are also reports of delays of around 15 minutes experienced by some pilots. During some periods of rapidly changing conditions, this can seem like an eternity. That is a limitation of the system that operators need to be aware of. But the point is that even at 15 minutes of delay, it's still a lot better than nothing at all.

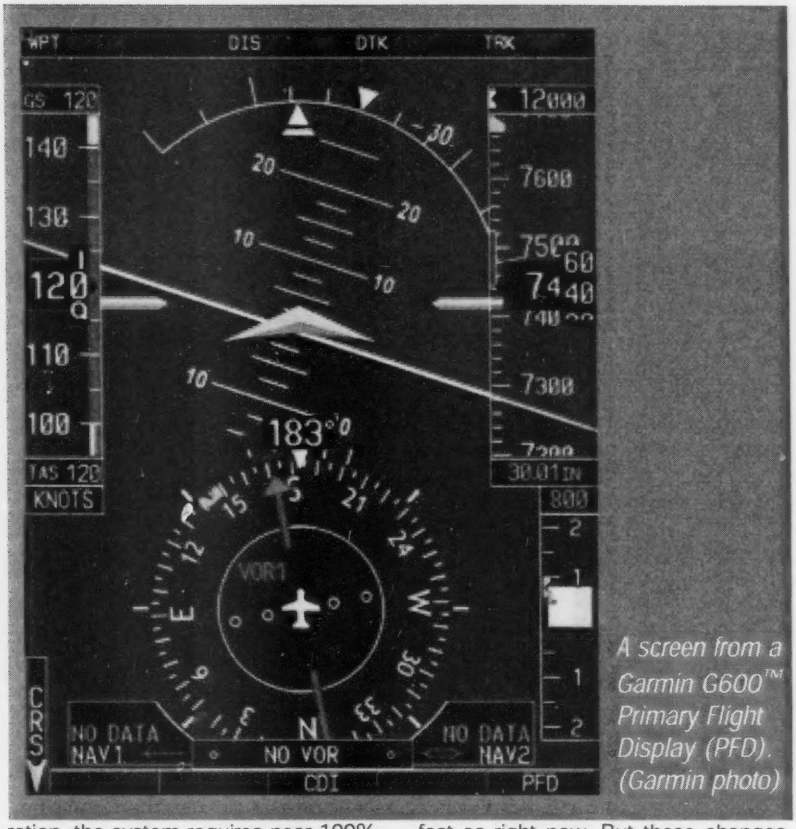
AUTOMATIC DEPENDENT SURVEILLANCE-BROADCAST

If satellite weather is now, then ADS-B is the future. ADS-B is the cornerstone of the NGATS and from comments by senior FAA officials will be required for full access to the modernized National Airspace System around 2020. In a very basic sketch ADS-B is a system that uses datalink technology to transmit aircraft information like position, speed, direction, intentions, and more. It's like a transponder with much greater capability. But unlike a transponder, it broadcasts without interrogation from ATC radar. ADS-B uses GPS with Wide Area Augmentation System (WAAS) to determine position. The system also allows every other properly equipped aircraft to see the other equipped aircraft. In the future the FAA is hoping to introduce self separation of aircraft, but in the meantime situational awareness should be markedly boosted.

Essentially ADS-B allows everyone to be working from the same sheet of paper. All pilots and controllers would have access to "radar" like information. This would be accomplished by Traffic Information System-Broadcast (TIS-B), which is a part of ADS-B that transmits and receives position information between aircraft. ADS-B also includes Flight Information Services (FIS), which will provide weather (both graphical and textual) and Special Use Airspace (SUA) information. Terrain Awareness is another key point for ADS-B, which uses a terrain database and GPS information to depict terrain relative to the aircraft's position. So ADS-B offers GA many advantages. The advantage to the FAA is "radar" like coverage in areas where setting up radar is impractical or impossible. ADS-B is not really a single system, but rather an integration of many useful technologies into one system.

ADS-B is in use by the FAA's Alaskan Region under a program called Capstone. The program has been very successful and had a positive influence on the safety record in Alaska. According to a study done by the University of Alaska, Anchorage, in 2003 "from 2000 through the end of 2003 the rate of accidents for Capstone equipped aircraft was lower by 40%." ADS-B is being tested at other locations around the country notably by Embry Riddle Aeronautical University with its training fleet. FAA is in the process of preparing to roll out ADS-B for larger areas of the country. As with any large scale change, it will take time to get the full advantage from the system, but I'm sure almost every pilot can see something in the ADS-B system that they would like to have today.

The one major challenge of ADS-B is that, to work as a means of sepa-



A screen from a Garmin G600™ Primary Flight Display (PFD). (Garmin photo)

ration, the system requires near 100% equipage of aircraft wishing to use the airspace. This means that operators would have to incur expense and aircraft downtime to get all the hardware and software needed installed. In the airline world, this means that reequipping would have to occur during heavy maintenance checks where crews would have access to the areas where wiring would need to be run and hardware installed. Since heavy maintenance checks are only performed about every seven years there isn't much time before the airline would have to start adding the new hardware to avoid massive downtime and lost revenue. While the installation is usually easier and much simpler on smaller GA aircraft, there would still be a significant cost to consider.

WHAT DOES THE FUTURE HOLD?

These are exciting times. Never before has so much been changing so fast as right now. But these changes mean that we have to adapt to the new environment. We need to become familiar with these computerized systems beyond simply pressing "Direct To." We need to focus more on avionics training. Conventional cockpits will never completely disappear, but more and more we will have to use these new systems. These systems offer great advantages, but you have to know how to use them, and there is far more depth to these systems than previous ones.

I see this revolution as being at a pivotal stage. Today we see much of what it will be, but are not yet forced to embrace it. Now is the time to acquaint ourselves with what we can, because there will come a time when the choice is no longer ours. The year 2020 seems like it's a long way off, but it's only 13 years away. Look at how much progress has been made in the last seven or so years and then double it. Common sense tells us that assuming the rate of progress will remain constant would be foolish. As with any breakthrough, progress and advancement will only accelerate perhaps even exponentially. So again, now is the time to become familiar with these systems while there's plenty of time to practice and gain experience before you have to use them to get full use of the National Airspace System.

So what are we, the FAA, doing to prepare? The short answer is a lot. Much of the FAA's capability and budget will be employed in the transition to this new system. One of the lessons learned from previous efforts has been to get the industry and stakeholders involved early. To that end the Flight Standards Service's Flight Technology and Procedures Division (AFS-400) held its third annual New Technology Workshop this January. Representatives from the FAA, aircraft operators, aircraft manufacturers, avionics manufacturers, airspace service providers from other countries, and many more met to hear about the technologies that are on the horizon for aviation and discuss how we can get there. The workshop covered many different subjects including: ADS-B, Unmanned Aerial Vehicles (UAVs), NGATS, International harmonization of airspace systems, and much more. This is just one of the ways FAA is trying to involve users in the redesign of the National Airspace System to meet the projected tripling of air traffic by 2025.

So what are you supposed to do about it? Well, most of you probably already use a GPS. Is it IFR certified? If so, are you really using it to its full capacity? Why not schedule some time with a knowledgeable instructor? That way you can get more out of your GPS today and be more prepared for the future. With GA cockpits starting to more closely resemble those of the airlines, our old "figure it out as we go" methods no longer make sense. No one wants to be the dinosaur standing in Times Square when the ADS-B ball drops, so we'd better get started now. Every little bit we learn now will make the future that much easier.

INTO THIN AIR

This vintage FJ-4 Fury jet is subject to the same density altitude and performance limitation as any other aircraft. Vintage aircraft pilots need to calculate their aircrafts' performance when density altitude or short runways may impact safe operations.

Dean Chamberlain photo

Density Altitude and Aircraft Performance

by Doug Gilliss

Like many pilots, I remember the caution that I was given by my instructor when I was learning to fly, "When it's hot outside or if you fly to airports with a high field elevation, don't take passengers or a full load of fuel." Good advice. However, today, decades later, we can be much more precise than a simple platitude and general caution when looking at flights from or to high elevations when the temperature outside is higher than a standard day; or when the humidity is higher than normal.

The appropriate label for examining the flight performance of an airplane in such situations, density altitude, is a calculation that produces a specific number representing the effective altitude in which the airplane will be flying. This calculated altitude is particularly important, since the performance of the aircraft—takeoff distance, landing roll, even climb performance—is determined by density altitude.

Interestingly enough, not only airplanes are affected by density altitude, any activity that depends on air density sees the effects of varying air density, including throwing a baseball, jumping in a parachute, or tuning a race car engine.

For a simple comparison, not only air is less dense from the effects of temperature, fuel and water also vary in density, and hence weight, with changes in temperature.

All Aircraft

For aircraft, density altitude calculations are not just a concern for light aircraft or low powered aircraft. And the effects are not restricted to reciprocating engines. Jet airliners, jet fighters, and aircraft generally thought to be high performance aircraft are affected too. I recall being on an airliner as a passenger once in Phoenix when the crew announced the departure would be delayed due to the high temperature (120°F). The density altitude was so high the airline dispatch office relayed to the crew that they were not able to compute it. "Off the charts" is how the crew explained it. Any flights into that atmosphere would be as a test pilot. Not what you want to do as a pilot.

Another time I was on an airliner where the crew elected to defuel the airplane. They reduced the amount of fuel the aircraft was carrying so the reduced weight would put the aircraft in limits, according to the takeoff performance calculations, so it would have sufficient power for a takeoff, given the temperature, altitude, and humidity.

Even military fighters have limits on what they can carry for fuel, ordnance, and weapons systems when the temperature gets very high, especially combined with higher elevation airports around the world and areas that experience high humidity.

The Inputs

There are three key inputs that affect density altitude: temperature, pressure altitude, and relative humidity. Those three combine to create the effective or real altitude your aircraft will be flying in; they allow you to accurately compute the density altitude. The combination of those inputs does not always produce uniformly good (relatively low density altitude) or bad (relatively high density) results. For example, you may have high temperatures and high pressure altitudes and enjoy low humidity. You may experience low pressure altitude and lower than standard temperatures with high relative humidity. Generally, the temperature and pressure altitude inputs more dramatically affect an aircraft's

performance than humidity does. Not that you should ignore high relative humidity situations, but usually using a ten percent modification to performance data (worse performance) will include the effects of high humidity.

The most dramatic affects—negative performance factors—result from high temperatures and high pressure altitudes, producing the least favorable conditions for aircraft performance.

Without limiting our discussion to molecular analysis, we can nonetheless conclude that the reason for a reduction in aircraft performance (from many perspectives) is the result of the effects of less dense air on both the aircraft airframe and the aircraft engine. Simply put, lift is created by airflow over the wing; when that airflow has fewer molecules of air, lift is reduced—for the same speed through the air. Similarly, engine power is reduced because the air is less dense, limiting the power produced from combustion. It's like taking off at a field with a higher field elevation.

Let's look more closely at specific effects of high density altitude on aircraft performance.

High Density Altitude: The Pilot's Perspective

Generally, pilots experience detrimental effects when flying out of or into high density altitude fields: reduced takeoff performance, slower rate of climb, higher true airspeed on landing, and a longer landing roll. Let's look at each one.

1. Takeoff

One of the most critical effects is reduced takeoff performance. Less power from the engine combined with less lift from the wings require a longer runway. Pilots are frustrated sometimes from the slow acceleration and longer takeoff roll necessitated by the less dense air, compared to the performance experienced with the temperature on a standard day at an airport with a lower elevation.

It is important to mention that the indicated airspeeds for takeoff, approach, and landing remain the same for an airframe of the same configuration and weight. Higher density does not change indicated airspeeds for takeoff or landing, but it does cause a higher true airspeed and, depending upon wind, a higher groundspeed. That means takeoffs and landings require more runway. Tire speeds are higher. Brakes may be less effective, from the pilot's perspective, since the aircraft is stopping from higher groundspeeds.

Indicated speeds always remain the same for a specific airfoil shape and design. What changes is the amount of air needed to produce those indicated airspeeds. Less dense air (fewer molecules) requires more volume of air passing over the wing and through the pitot tube to produce the same lift and reach the same indicated airspeed. Consequently, pilots need not increase indicated airspeed for a given aircraft weight in high density situations, but they must remember that they will see less power, slower acceleration, and higher groundspeeds on take off and landing

2. Climb

The effects of high density are not limited to takeoff and landing. Climb performance suffers as well. No different from climbing at reduced power with a smaller engine or with greater aircraft weight, climbing in high density altitude situations more pilots see reduced rates of climb. The fact is the engine is lower powered than in denser air, so allowances for this reduced performance must be made.

Cruise performance, ironically, may be no different than normal. Unless the temperature is much higher than normal for your cruise altitude, your cruise performance should not change dramatically—other than the fact that it took you longer to reach your cruise altitude. At cruise altitudes, the engine performance deteriorates based on air density. At the same time, fuel economy, jet engine or reciprocating, is improved. Air is always less dense as altitude increases, whether from climbing to altitude or taking off from higher elevations and temperatures.

3. Approach and Landing

When flying an approach into an airport that has a high field elevation and high surface temperature, key ingredients for a high density altitude situation, pilots use the same indicated airspeeds for normal approaches. The variables for indicated airspeed will be

This vintage Mikoyan-Gurevich (MiG) 15 faces the same density altitude and performance limitations as the FJ-4 Fury.

Mike W. Brown photo

limited to aircraft weight and any consideration for winds. However, it is important for the pilot to realize that even though the indicated airspeed remains constant, higher true airspeeds, resulting from the high density altitude, require some additional planning and flying techniques. Assuming a no wind condition, ground speed (true airspeed adjusted for wind) will be higher than normal for lower field elevations and temperatures.

Imagine landing 10, 20, or more knots faster than normal—plan for longer landing rolls and less effective braking, requiring smooth braking techniques. The higher speeds may require foregoing landing at some airfields. So planning is definitely part of flying in high density conditions—both for takeoff and landing.

How Bad Is Bad?

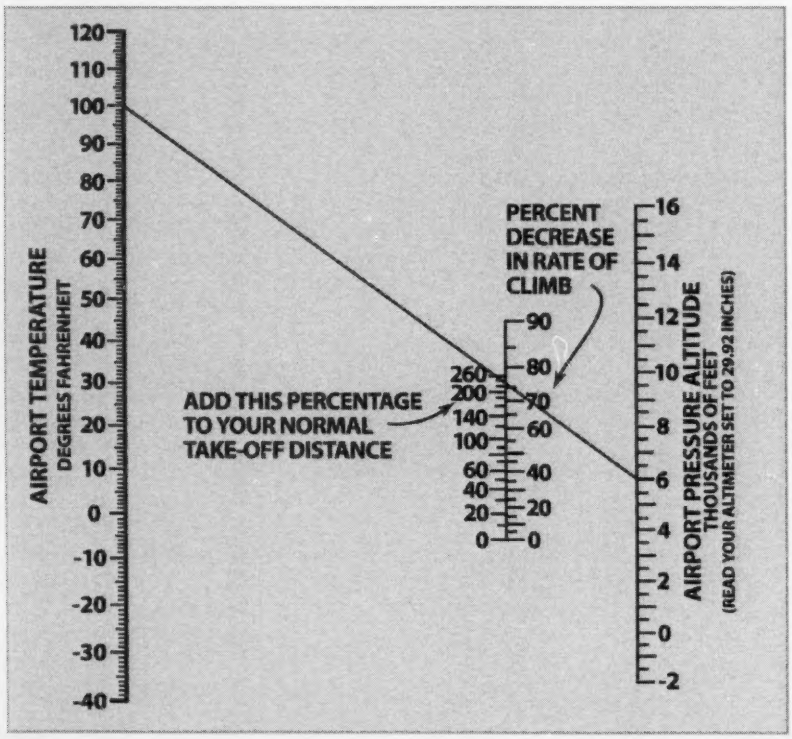
It makes sense that cautions are in order for flying in high density altitude situations. However, how much performance do we lose as pilots facing 7,000 feet, 8,000 feet, 9,000 feet, or higher density altitudes? Some rules of thumb would be handy, but precise calculations to enable our planning would be even better.

A chart showing the effects of density altitude and deterioration in performance for various combinations, called a Koch Chart, is shown below.

To use the chart connect the airport temperature and airport pressure altitude data with a line. The line will cross the center scale, showing relative performance changes. Notice the combination of 100°F and 6,000 feet pressure altitude produces a takeoff distance over twice the normal takeoff distance for a standard day. Higher combinations of temperature and pressure altitude produce even more dramatic data.

See the Pilot Operating Handbook

The only way to calculate effects of high density altitude that have been proven in aircraft flight tests is to consult the aircraft's pilot operating handbook (POH) or military aircraft flight manual--the "dash one" for the USAF and NATOPS for the U.S. Navy. Other countries' military publications are similar and provide performance charts for various combinations of temperature and density. One caution though, just like my airline experience where the flight was delayed, don't try to compute data that exceeds the limits of the charts. You'll be in the test pilot business without the safeguards normally afforded test pilots.



Planning and Compensating for High Density Altitude

Naturally, avoiding flying to fields that have high density altitude—high enough to challenge keeping takeoff and landing distances within safe limits—is the best way to maintain safe flight practices. There are, though, some techniques that will permit pilots to fly to and from fields that may otherwise be unreachable. For example, electing to takeoff and land early in the morning or after sunset, when temperatures are lower, will provide a larger margin of safety than landing midday under high temperatures.

Carrying less weight in the airplane, whether taking fewer passengers or less fuel, also allows the pilot more flexibility in flying in high density altitude situations. Although it is standard procedure, adjusting the mixture for reciprocating engines to maximize engine power, is one more way to be certain takeoff power is maximized in high density altitude situations. It's not intuitive for pilots used to flying at lower elevations to lean the mixture on takeoff, but it's necessary to produce the power the engine was designed to produce—very important on takeoff in high density altitude situations.

By recognizing what high density altitude means to flying any kind of aircraft, then using the best techniques to overcome those limitations, will let us fly where we want to go and be safe in our flight operations.

Doug Gilliss is an Experimental Aircraft Examiner in Southern California.

FITS and Learner Centered Grading

FAA/Industry Training Standards - Part 4

by Tom Glista, FAA FITS Program Manager

My last article touched on one aspect of FITS training methodology, Scenario-Based Training. This article will discuss another aspect of FITS training methodology, Learner Centered Grading (LCG). LCG improves learning by engaging the student and increasing the student's motivation to learn. In the world of flight instruction, we deal with adult learners (andragogy). This is opposed to pedagogy, or child learners. For my collegiate friends, andragogy assumes that the point at which an individual achieves a self-concept of essential self-direction is the point at which he or she, psychologically, becomes an adult. Adults need to be involved in the planning and evaluation of their instruction (self-concept and motivation to learn). Experience (including mistakes) provides a basis for learning. Learning activities and/or experiences provide the opportunity for a learner to more quickly develop expertise. Adults are most interested in learning subjects that have immediate relevance to their job or personal life (readiness to learn). Adult learning is better when problem-centered rather than content-oriented (orientation to learning) is used. LCG takes advantage of the way the adult learns by involving them in the grading process.

Why do we grade students? There are many reasons: Reward or punish the student (both can be motivating factors). Keep the parents (who may be paying the bills) informed. Warn the next instructor. Delay the check ride until the student meets performance standards. There are other things we need to think about concerning grading. How does the student react to grading? Does student reaction affect the grading scale? Is grading a control issue? Could grading be more objective? How is the overall lesson grade different from the task grade? How do we grade decision making? LCG helps answer these questions.

Traditional grading might be A, B, C, D, or F; or Outstanding, Very Good, Satisfactory, Unsatisfactory, or Not Observed. These are inherently subjective. The FITS training methodology separates LCG (which is a more objective way of grading) into two sections: Maneuvers Grades and Single Pilot Resource Management (SRM) Grades.

Maneuvers Grades:

- **Describe** – At the completion of the scenario, the Pilot-in-Training (PT) will be able to describe the physical characteristics and cognitive elements of the scenario activities. Instructor assistance is required to successfully execute the maneuver.
- **Explain** – At the completion of the scenario the PT will be able to describe the scenario activity and understand the underlying concepts, principles, and procedures that comprise the activity. Instructor assistance is required to successfully execute the maneuver.
- **Practice** – At the completion of the scenario the PT will be able to plan and execute the scenario. Coaching, instruction, and/or assistance from the certificated flight instructor (CFI) will correct deviations and errors identified by the CFI.
- **Perform** - At the completion of the scenario, the PT will be able to perform the activity without assistance from the CFI. Errors and deviations will be identified and corrected by the PT in an expeditious manner. At no time will the successful completion of the activity be in doubt. ("Perform" will be used to signify that the PT is satisfactorily demonstrating proficiency in traditional piloting and systems operation skills. Perform meets the minimums of the Practical Test Standards.)
- **Not Observed** – Any event not accomplished or required.

SRM Grades:

- **Explain** – The PT can verbally identify, describe, and understand the risks inherent in the flight scenario. The PT will need to be prompted to identify risks and make decisions.
- **Practice** –The PT is able to identify, understand, and apply SRM principles to the actual flight situation. Coaching, instruction, and/or assistance from the CFI will quickly correct minor deviations and errors identified by the CFI. The PT will be an active decision maker.
- **Manage/Decide** – The PT can correctly gather the most important data available both within and outside the cockpit, identify possible courses of action, evaluate the risk inherent in each course of action, and make the appropriate decision. Instructor intervention is not required for the safe completion of the flight.

OBJECTIVE AND SUBJECTIVE GRADING

How does LCG become more objective than traditional grading? Each lesson in a curricula should list each task with a LGC grade that is appropriate for that level of lesson. For example, your pilot-in-training is a student pilot in a private pilot course. During flight number 2, the PT is able to maintain altitude, plus or minus 200 feet, in a steep turn. Traditionally, they would get an outstanding. But, if the same PT was about to take the private pilot practical test, it would be unsatisfactory. In the FITS curricula, the appropriate maneuvers grade for steep turns in lesson 2 might be explain or practice (in other words, at the appro-

priate level for that lesson). In final flight before the practical test, the appropriate grade would be perform (meeting the requirements of the practical test standards). LCG allows flight students to know exactly where they are in their training and, if a different instructor is assigned to teach a lesson, then the new instructor knows the level of performance of the pilot in training.

APPLYING LCG

So, how do we apply Learner Centered Grading? Let's take an example of grading a single maneuver, a cross-wind landing.

In the ***Maneuvers Grading:***

- **Describe** level-The PT can describe that they must bank the airplane into the wind in order to stay over the runway and also use opposite rudder to keep the longitudinal axis aligned with the runway (but they cannot do it to save their life).
- **Explain** level-They understand that as the airspeed decreases during landing, additional aileron and rudder inputs are required. They understand the aerodynamic issues involved in crosswind technique (they still cannot perform a crosswind landing).
- **Practice** level-The PT is starting to get it, but the instructor must once in a while intervene.
- **Perform** level-The PT can consistently do crosswind landings to the practical test standard. Although mistakes might be made, the PT catches them and makes appropriate corrections.

In the ***SRM Grading*** of crosswind landings:

- **Explain** level-The PT knows that the airplane has a maximum demonstrated crosswind component and should not attempt to land in those conditions. The PT may also understand that, if the conditions warrant, he or she should go-around.
- **Practice** level-The PT, with coaching/questioning from the instructor, will start making appropriate decisions on which runway to land or go around, if he/she finds the conditions are above his/her or the aircraft capability.
- **Manage/Decide** level-The PT understands not only the airplane limits, but also his/her own limits. The PT makes appropriate decisions on which runway to land and goes around if the conditions are not what the PT expected. The PT will gather all appropriate information (i.e., if at the destination no runway is appropriate, they call another airport or flight service and go to an appropriate alternate), without coaching from the instructor.

GRADING IN A SCENARIO

Here is another example in the context of a flight lesson scenario. The pilot-in-training is a private pilot working on an instrument rating. The PT departs the home airport and flies most of this first leg correctly. While approaching the destination airport, Air Traffic Control (ATC) issues a pilot discretion descent to 3,000 feet (which is 100 feet above the initial approach altitude). The PT waits too long to start the descent. ATC clears the PT for a GPS approach. The PT realizes he/she is too high and begins a rapid descent. At the final approach fix, the PT is still 400 feet above the final approach fix altitude and 20 knots too fast. One-half mile from the missed approach fix, the PT decides to go around because he/she is high and too fast. The PT conducts a beautiful missed approach procedure, makes all appropriate calls to air traffic, and enters the holding pattern flawlessly. Because of time constraints, and since the weather is VMC, the CFI cancels IFR and the PT does a good VFR approach and landing. What kind of grades, both overall and for each task, should this pilot in training receive?

This is how I would grade the pilot. Yours may be slightly different. For **Maneuvers Grades:** VFR approach and landing-Perform. Missed approach-Perform (it was perfect). Aircraft control-Practice (the aircraft was high and fast). GPS approach-Not Observed (never completed it). Holding-Perform. **SRM Grades:** Missed approach-Manage/Decide (the pilot knew there were problems, and instead of trying to salvage the approach and possibly overshooting the runway or landing fast and loosing control, he/she decided to go missed), Single Pilot Resource Management-Explain (Descent planning is where all the problems started). Grade for the lesson-Practice.

STUDENT SELF-DIRECTION

The last part of LCG is the self evaluation as well as the instructor evaluation of the pilot in training. This process feeds the adult learner's deep psychological need to be perceived by others as being self-directing. When adult learners find themselves in a situation in which they are not allowed to be self-directing, they experience a tension between that situation and their self-concept. Adult learners have a variety of experiences of life which represent the richest resource for learning. If adult learners are not allowed to be self-directing, their reaction is bound to be tainted with resentment and resistance. After each lesson, the PT and the instructor separately fill out a grading sheet for that lesson. Then both grading sheets are compared during the post flight critique. Discussing the differences in the way the instructor and pilot-in-training graded each task, both the instructor and PT will know what and how each was thinking during the lesson. It also allows the PT to uncover/articulate their own mistakes, recognize the limit of their own knowledge, analyze a situation or events, and to value their own observations.

Major learning, especially development of aeronautical decision making and risk management skills, can take place with appropriate debriefings and LCG. This is done by the use of probing questions. In the GPS approach scenario above, use questions such as: What went wrong? When should you have started your descent? Is

(Continued on Page 33)

Raymond Stinchcomb photo of a B-25 aircraft at the Lone Star Flight Museum in Galveston, TX.

The Anatomy of a "Warbird" Type Rating, Part I

by Tim Jackson

We all know, if you are going to fly aircraft in the U.S. National Airspace System, that you are required to be certified. That means being trained by someone certified to conduct the specific training and, at some point, being evaluated based on a known standard, the Practical Test Standards (PTS). If successful, you are issued a temporary pilot certificate for the rating sought, followed by the permanent certificate arriving in the mail hopefully in less than 120 days. It is easy to say all that, but it takes time, money, a certain amount of drive, and often a sacrifice of some kind to accomplish this goal.

When you want a Private, Commercial, or ATP certificate or wish to add a rating to your certificate, like an Instrument or Multi-engine rating, you will likely seek out a local flying school to get the task done. Flight schools owe their existence to providing quality training, which should provide you with two things:

1) They should instill in you the aeronautical knowledge and practical skills required to safely operate the aircraft for the rating sought, so you minimize the risk of injury to yourself or the people around you; and

2) Teach you to fly to the standard required for the evaluation known as the practical test.

To accomplish this, a flight school will have some useable structure that will guide you from start to finish. They do this by having a staff of instructors, paid essentially by you, the student. Included in this structure and essential to a successful outcome is some form of ground school and flying curriculum that acts as a guide and provides skill level standards as training takes place. These training programs follow FAA guidance and are built so that you the student will succeed. In other words, they give you everything you need, all you have to do is perform.

What then do you do if you find yourself with the opportunity to fly a B-25 as pilot-in-command? Well guess what, you are going to need a Type Rating in the B-25. You will then

be asking yourself, where in the world am I going to get the training for that? There are no flight schools that provide B-25 training. I have at least part of the answer for you, and it is the reason I'm writing this article.

Let's start with the actual reason that you need a type rating for this airplane in the first place. Most of us would call the B-25 a "warbird." The FAA term is Vintage Aircraft. Either way, by definition the B-25 is a large aircraft because it has a maximum certificated takeoff weight of more than 2,500 pounds. The Type Certificate Data Sheet (TCDS) for the B-25 lists that weight at 34,000 lbs. Title 14 Code of Federal Regulations (14 CFR) §61.31(a) is the regulatory guidance that says large aircraft require a type rating. In addition, the type of airworthiness certificate plays a role. Most B-25's have an airworthiness certificates in the LIMITED category. This means that someone in the past had petitioned the FAA to issue a type certificate for the B-25 or at least for certain models of the B-25. Therefore the FAA has determined that these certain models require a type rating for the PIC, and the designator that appears on your certificate is N-B25.

If your large warbird has an airworthiness certificate issued in the EXPERIMENTAL category and is ineligible for a LIMITED category certificate, then you need to have it listed as an AUTHORIZED EXPERIMENTAL AIRCRAFT on your pilot certificate. I will cover the experimental aircraft in greater detail in a future article, but for now let's stick with the type rating issues.

So if your B-25 or other "Large Warbird" has an airworthiness certificate issued in the LIMITED category, then you will need a type rating to act as PIC. What prerequisites are there for you if you are planning on getting a type rating in a warbird, in our case a B-25? In general you need:

1. At least a third class medical certificate [14 CFR §61.39(4)]
2. At least a Private pilot certificate
3. To hold or concurrently obtain an Instrument rating that is appropriate to the category, class, or type rating sought [14 CFR §61.63(d)(1)]
4. To have received training that is appropriate to the aircraft category, class, or type for the aircraft to be flown
5. To have received the required endorsements from an instructor who is authorized to provide the required training

A couple of questions should pop into your head right now, the first concerning prerequisite 3. Why in the world do you have to have an Instrument rating if you are going to fly VFR in these "vintage" aircraft, especially if the airplane doesn't have the instrumentation to fly IFR? The simplest answer I can give you is that this is a "pilot/people" rating, not an "aircraft/machine" rating and this rating is conducted at the Airline Transport Pilot (ATP) level, in terms of test standards [14 CFR §61.63(d)(4)], and ATP standards imply that you have an instrument rating.

The next question you might ask concerns prerequisites 4 and 5 which involve training and the requirements of the person who can train you. There is plenty of information available when it comes to what needs to be learned/taught for a type rating. For starters, 14 CFR §61.157(c) provides a general list of the areas of operations that you will be required to know. The *Airline Transport Pilot and Type Rating Practical Test Standards* (PTS), FAA-S-8081-5E, as amended, is helpful because it is a guide for the examiner when conducting a practical test and is a must read for both you and your instructor. A free copy can be downloaded off the FAA's Web site at <http://www.faa.gov/education_research/testing/airmen/test_standards/pilot/>.

A third reference is Advisory Circular 61.89E, *Pilot Certificates: Aircraft Type Ratings*, which provides a generic type rating curriculum that serves as a basis for instructors to develop a training program outline to meet the type rating training requirements. A free copy can be downloaded from the FAA Web site at <http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/0/e6f473d2ab86c8cc86256ab600731af2/$FILE/Ac61-89e.pdf>. As a "bonus," at the back of the AC there is a listing of aircraft that require type ratings and the actual designation used by the FAA and put on your pilot certificate. This includes all the modern and vintage aircraft although I have noticed at least one warbird missing from the list.

Let me get a quick plug in for the FAA. If you haven't visited its Web site at <http://www.faa.gov>, please do so. Just about every document that the FAA has published is on this site somewhere and you can download whatever you want and have it in an electronic format. This is the place that you can also find the Type Certificate Data Sheet for the aircraft that you are trying to get type rated in. We will get more into that subject in Part II of this series.

Back to the subject at hand. Prerequisites 4 and 5 go hand in hand since the person who trains you is more than likely going to be the person who will provide the required endorsement and that person is referred to as an "authorized instructor." The definition of an "authorized instructor" can be found in 14 CFR §61.1(b)(2) which reads:

> *A person who holds a current flight instructor certificate issued under part 61 of this chapter when conducting ground training or flight training in accordance with the privileges and limitations of his or her flight instructor certificate.*

In this case we are referring to a CFI as an "authorized instructor," lower case "a" and "i." I mention this because there does exist an "Authorized Instructor" certificate, upper case "A" and "I." An "Authorized Instructor" in this case may instruct in experimental aircraft for which no type designation exists and will be aircraft specific, but who may not use that authority the way a CFI could, such as training someone for a type rating.

Does that mean that any flight instructor can give you the training, es-

pecially if they are really bright? Once again the regulations provide the answer based on the instructor's privileges and limitations.

First the Privileges

CFR §61.193(e) FLIGHT INSTRUCTOR **PRIVILEGES**. A person who holds a flight instructor certificate is authorized within the limitations of that person's flight instructor certificate and ratings, to give training and endorsements that are required for and related to:

(e) An aircraft rating. [i.e. Type ratings. In reality this is a generic authorization to train people to be pilots at all levels.]

Now the Limitations

CFR §61.195(b) and (e) FLIGHT INSTRUCTOR **LIMITATIONS** AND QUALIFICATIONS. A person who holds a flight instructor certificate is subject to the following limitations:

(b) Aircraft ratings. A flight instructor may not conduct flight training in any aircraft for which the flight instructor does not hold: (1) A pilot certificate and flight instructor certificate with the applicable category and class ratings; and (2) If appropriate, a type rating.

(e) Training in an aircraft that requires a type rating. *A flight instructor may not give flight training in an aircraft that requires the pilot in command to hold a type rating unless the flight instructor holds a type rating for that aircraft on his or her pilot certificate.*

This would be a good place to mention that the CFI will also need to be "current" for that aircraft if he/she is going to occupy a pilot seat. With few exceptions, someone on the aircraft needs to be able to act as a legal PIC and that person is likely going to be the CFI conducting the training. So the CFI also will need to have a current Pilot Proficiency Check under CFR §61.58.

It certainly appears then that the person who can/will give you the training required for a type rating has to be an authorized instructor (CFI) and that CFI requires a type rating in that aircraft.

A Few Words about the Endorsement

At least three different sections of part 61 mention the need for an endorsement when trained by an authorized instructor in order to be eligible for a practical test. These sections are 14 CFR sections 61.39, 61.63, and 61.157 and they provide information about what the endorsement should reference and where it should be written, which is in your logbook or training record. For type ratings there is no requirement for the instructor to sign the back of the pilot application, form 8710-1 nor may the examiner accept the signature of the instructor on the 8710-1 in lieu of the logbook endorsement. It is certainly not wrong to have the instructor sign the back of the 8710-1 and it is highly recommended to have that done.

If you are an instructor providing the training and endorsement or the pilot applicant for the type rating, you need to know the following. If the pilot for the type rating has a private or commercial certificate then the part 61 reference for the endorsement is §61.63(d)(2)&(3). A pilot who holds an ATP and is adding a type rating uses as a reference §61.157(b)(1)&(2).

The endorsement should read something like this:

> I certify that *Mr. Orville Crossfield,* certificate # 1234567, has received the training required by CFR §61.157(b)(1)&)2) for the addition of a N-B25 type rating.
>
> 12/22/2006. Scott Wright. 7654321CFI. Exp. 09/30/2007.

Now that you know what you need and why you need it, you still have to come up with an instructor and an examiner. Currently there is no one place you can go as a single resource to find an instructor. Most information about who can instruct is passed word of mouth either from the owner of the airplane or from friends who have already been down that road. If you find yourself looking for an instructor and getting no where fast, feel free to contact me by e-mail. This offer doesn't just apply to the B-25. Although I don't consider myself as having my finger on the pulse of the warbird industry, in general I am more involved in the training and examining end of things than your average warbird operator and I just might be able to help you. My e-mail address is WarbirdPlt@aol.com.

The examiner issue is slightly easier to initiate due the existence of the National Designated Pilot Examiner Registry, NDPER for short. In this program there are a handful of experienced pilot examiners who can conduct type ratings and Pilot Proficiency Checks in virtually every vintage aircraft ever made that requires a type rating. A list of these examiners can be found on the Experimental Aircraft Association Warbirds Web site, <http://www.warbirds-eaa.org/programs/examiner.html>. There is certainly no requirement for having to use an NDPER, but there are very few local pilot examiners for vintage aircraft and the number is decreasing. Here again I might be able to give you some information if you drop me a line.

It's disclaimer time. The information I just provided you is an attempt by me to help anyone needing a type rating in a warbird. Although I have been involved with this process since 1992 as the applicant, instructor, or examiner, I don't consider myself the final authority. I also don't consider myself a very good writer. So if you have some heartburn with anything I've written, simply drop me a note with an explanation and we'll have some fun sorting it out.

Part II of this series will cover what is expected of you during the practical test and what you can do to prepare for it.

Good luck and maybe we will meet at an airshow some day.

Tim Jackson is pilot examiner for the Milwaukee (WI) Flight Standards District Office.

WAAS

Another great reason to update your charts

by Brad C. Zeigler

For a newly certificated instrument pilot, a new chart cycle is almost like Christmas morning. As a subscriber to the United States Government Flight Information Publications, every 56 days large envelopes arrive in the mail. The flight bag is emptied of over-folded, en route charts, dog-eared *Airport/Facility Directories* (A/FD), and terminal procedure books littered with post-it notes and highlighter marks. These fresh new publications would replace the tired old guides and serve as the basis for an instrument flying playbook.

Just as a coach with a hope of victory reviews his playbook for effectiveness, I made a habit of examining my frequently used airports for updates—especially for approach procedures. And then I noticed something I had never seen before on a RNAV (GPS) approach chart—an LPV line of minima.

As you may be aware, LPV refers to localizer performance with vertical guidance, a type of vertically-guided procedure using the Wide Area Augmentation System (WAAS). You may also be aware that the FAA has been publishing procedures with LPV minima since September 2003, with Oklahoma City (OKC); Frederick, Maryland (FDK); and Oshkosh (OSH) among the first to see them. What you may not realize is that the FAA has committed to publishing 300 new LPV procedures each year, with a long term goal of building a procedure to every airport runway in the National Airspace System (NAS) that will qualify. As of January 2007, 675 airport runways are served with an LPV approach. This represents nearly 17% of the 3,988 GPS-based instrument approach procedures.

WAAS also allows pilots to fly Lateral Navigation/Vertical Navigation (LNAV/VNAV) minima. There are nearly 1,200 runways served by both LPV and LNAV/VNAV, or by LNAV/VNAV alone that can be safely flown with WAAS vertical guidance—usually to much lower minima than other available non-precision approach procedures. In comparison, 1,145 runway ends in the NAS are served by an Instrument Landing System (ILS).

How low?

LPV offers minimums for decision altitude (DA) as low as 200 feet height above touchdown (HAT) and visibility as low as 1/2 mile depending on airport infrastructure and surrounding obstacles. For LNAV/VNAV, it's down to 350 feet and 3/4 mile, respectively. The determination of visibility minima is a function of the DA distance from threshold, airport infrastructure, and approach lights.

Veteran instrument pilots know that the ILS has been providing this cloud-piercing capability for years. What does WAAS vertical guidance offer that a traditional ILS does not? For one thing it's access—of all of the LPV approaches published, half of them are to runways not served by an ILS, and a quarter is to airports without an ILS serving any runway. Suddenly, airports that couldn't justify the multi-million dollar expense of installing and maintaining an ILS can qualify for an LPV at a fraction of the cost.

It's also about the quality of the signal. With three meter horizontal and four meter vertical accuracy, a certified WAAS receiver transforms this three-dimensional position into very stable lateral and glide path guidance. Signal blockage on the ground is no longer a concern. A related disadvantage is that a needle swinging back and forth like a metronome can no longer be blamed on anything other than the pilot's instrument skills.

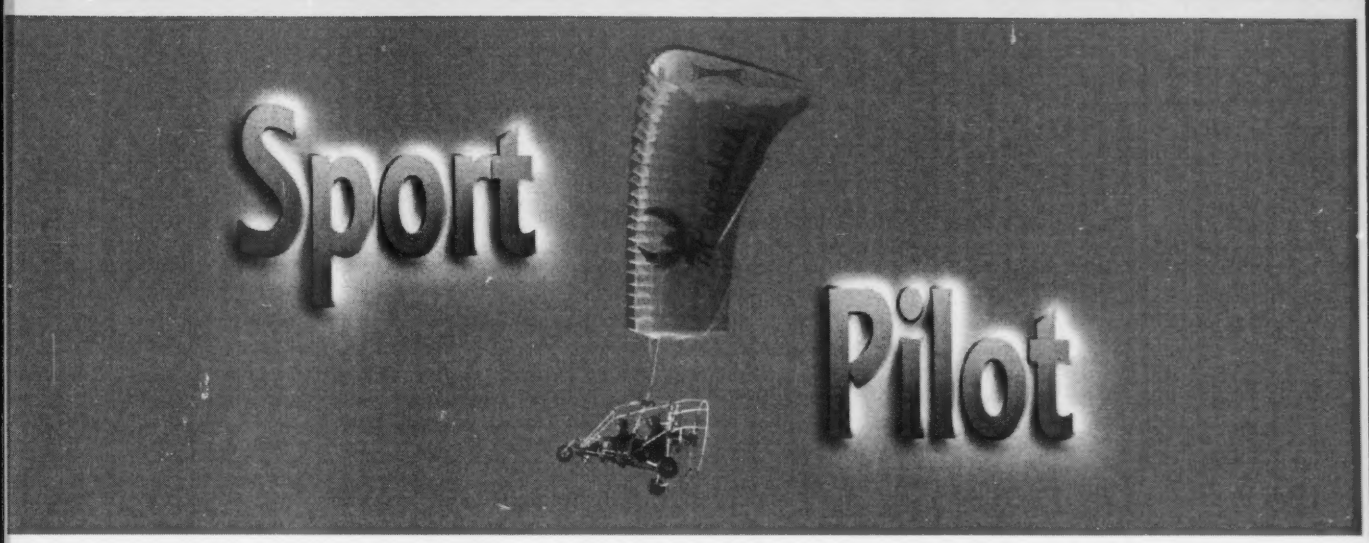
Where's my LPV?

Like an ILS, an LPV approach allows a pilot to fly an aircraft in instrument meteorological conditions within a relatively close proximity to the ground. Accordingly, an airport obstruction survey is necessary to ensure aircraft flying the procedure maintain sufficient clearance from obstructions and terrain. Assuming the survey does not turn up any immovable obstacles, an airport must meet minimum criteria regarding runway length and width, obstruction free zones, and instrument runway markings. Additionally environmental (i.e. noise) and air traffic issues must be considered. While the specific requirements are much too complex to be discussed here, the basic message is that many airports will be able to get an LPV procedure, but not every one.

Coming soon to a Terminal Procedure near you

There's a good chance you're already in the vicinity of an airport with an LPV procedure. If you have a WAAS certified GPS receiver installed don't expect your controller to offer an LPV approach to you—in air traffic control speak it's an RNAV approach, regardless of what line of minima you're capable of flying. To find the location of a current or planned LPV procedure near you, check out <http://gps.faa.gov>, and click on the link "GPS/WAAS Approaches."

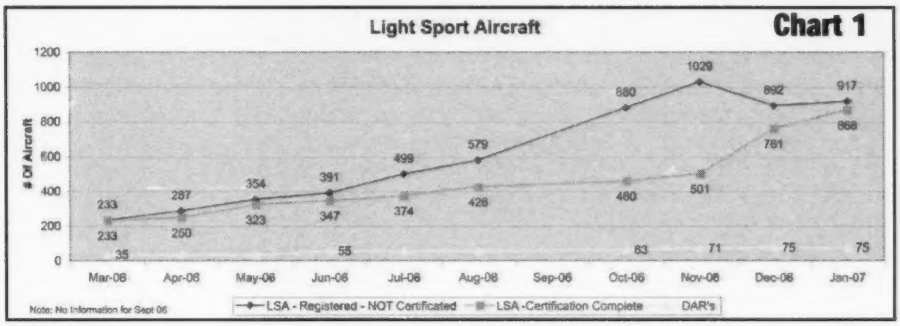
Brad Zeigler is a contractor supporting FAA's Navigation Services, Satellite Program Office (ATO-W). He is also an active certified Instrument Flight Instructor in the Washington DC area.



January 31, 2008, and What It Means to Light-Sport Aircraft and Repairmen

by Edsel Ford

Time passes quickly. As it does, the next milestone for light-sport aircraft and repairmen races toward us at a seemingly relentless pace. January 31, 2008, is the date when certifying experimental aircraft under Title 14 Code of Federal Regulations (14 CFR) §21.191 (i)(1) will no longer be allowed. The light-sport industry and pilots are nearing the end of the opportunity to transition their vehicles that do not meet 14 CFR §103.1 requirements into experimental light-sport aircraft.



With that in mind perhaps we should look at where we stand with regard to light-sport aircraft registrations and certifications. Chart 1 shows the increase in the number of light-sport aircraft registered and certified. As of January 2007, there were 1,785 aircraft either certified or in the process of certification. As Chart 1 shows, this represents a steady increase in the overall size of the registered light-sport community.

A big question is what happens to machines that fail to make the conversion from ultralight training vehicles to experimental light-sport aircraft? After January 31, 2008, they will become illegal to operate and can only be parked or sold as spare parts. So as this critical date approaches, the light-sport industry and FAA must be prepared for a significant increase in certification activity.

Another question is what will be the availability of light-sport aircraft maintenance and repairs. Repairman

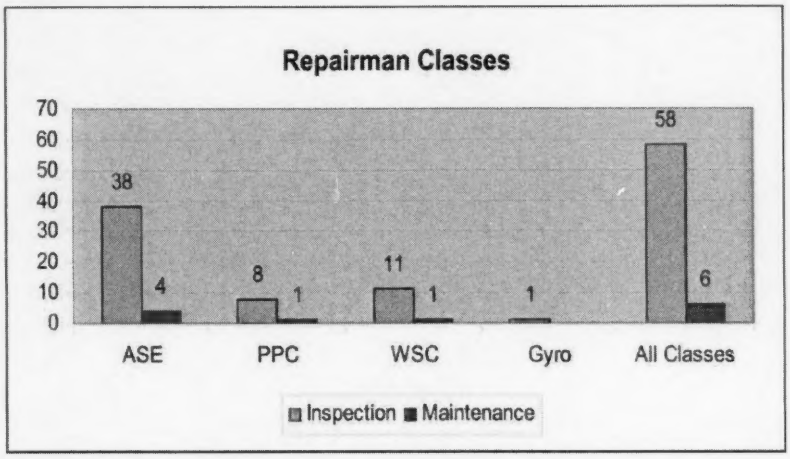
Chart 2

LSA-Course Provider	Insp. ASE	Insp. WSC	Insp. PPC	Insp. Gyro	Mx ASE	Mx WSC	Mx PPC
Rainbow Aviation Services	X	X	X		X	X	X
FUN AIR, LLC				X			
Sport Aviation Specialties	X	X	X				
EAA SportAir Workshops	X						
Virginia Aviation	X	X	X				
Aero Sports Connection			X				
Rochester Institute of Technology			X				
American Aero Inc.	X						

courses and classes for light-sport aircraft have been increasing in number. Chart 2 shows the providers and courses they offer. Chart 3 shows the course statistics. There are eight course providers offering training in four classes of aircraft (airplane single engine – ASE, weight shift control – WSC, powered parachute category – PPC, and gyroplane – gyro). A total of 64 classes have been presented, training approximately 640 repairmen, who can now be certificated. This is good progress, but as we look toward the future there is still a lot of work to be done.

Edsel Ford is with Flight Standards Service's Light-Sport Aviation Branch.

Chart 3



What Really Happened to a Transitioning "Ultralight Pilot" on January 31, 2007?

by Larry W. Clymer

As with any major change there are bound to be more questions than answers. The world of the new sport pilot is no different. The issue that now faces us is what happened on January 31, 2007, and what this means to you. Are you confused about what happens if you are an ultralight pilot and if you wanted to make the transition to a sport pilot, but you did not do it before the January 31, 2007, deadline? Have you been told that your letter from your ultralight organization is no longer valid? Well, you are not alone! There has been a lot of confusion on what really happened if an ultralight pilot did not obtain a sport pilot certificate on or before the January 31, 2007, cutoff date referenced in Title 14 Code of Federal Regulations (14 CFR) §61.329(a)(1). In basic terms, an ultralight pilot who has not already obtained a sport pilot certificate will no longer be able to use his/her letter documenting previous ultralight experience to obtain a sport pilot certificate under the more relaxed standards. This deadline only applied to ultralight pilots who were registered with one of the four FAA recognized organizations on or before September 1, 2004. If you are not one of these pilots, this date does not apply to you.

If you are flying an ultralight that meets 14 CFR §103 requirements, then no sport pilot certificate is necessary.

To understand this rule you need to break 14 CFR §61.329(a) into two parts. First, part §61.329(a) (1) describes the January 31, 2007, deadline and how it only applies to ultralight pilots who were part of a recognized organization on or prior to September 1, 2004. Next, part §61.329(a) (2) applies to anyone who has registered as an ultralight pilot after September 1, 2004. The January 31, 2007, deadline never applied to you.

In reality the special provisions provided for in §61.329(a) (1) expired on January 31, 2007. Effective February 1, 2007:

1. You must have the aeronautical knowledge requirements specified in § 61.309. This means you must now receive and log ground training from an authorized instructor or complete a home-study course on the applicable aeronautical knowledge areas for a sport pilot.
2. You must have the flight proficiency requirements specified in § 61.311. At which time, you must receive and log ground and flight training from an authorized instructor on the appropriate areas of operation for the category of light-sport aircraft being sought.
3. You must have the aeronautical experience requirements specified in § 61.313. At which time, you must log the flight experience required for the applicable category of light-sport aircraft for which you seek to obtain a sport pilot certificate.
4. You will no longer be able to use the knowledge test for a flight instructor certificate to obtain a sport pilot certificate. If you have only taken the flight instructor knowledge test, you will also be required to take the

sport pilot knowledge test for your category of light-sport aircraft.

5. You will no longer be able to obtain an endorsement for each category, class, and make and model of aircraft listed on your ultralight pilot records. You will have to take and pass a proficiency check for each additional category and class of light-sport aircraft being sought.

Does this mean you will no longer be able to use the logged aeronautical experience you have obtained as an ultralight pilot? The answer to this question is no. Title 14 CFR §61.52 authorizes you to use your ultralight flight experience. One misinterpretation of §61.52 is that the ultralight flight experience obtained while a member of an FAA recognized ultralight organization is ONLY valid until January, 31 2007, for pilots or January 31, 2008, for flight instructors. This is not the case, your aeronautical experience obtained under §61.52 is good forever! Your organizational membership letter and your logbook will qualify as proof of your experience. Therefore, you will need to keep these documents until you have obtained the certificates and/or ratings being sought.

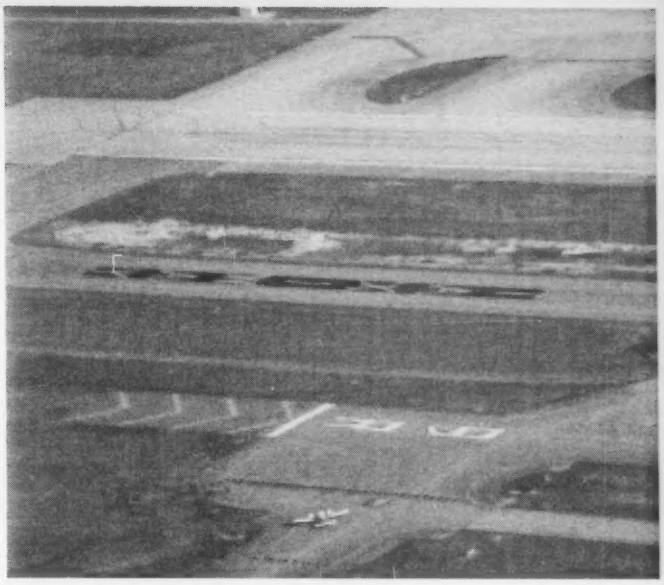
The aeronautical experience obtained in an ultralight vehicle, however, can ONLY be used to meet the requirements for a sport pilot certificate, a flight instructor certificate with a sport pilot rating, and/or a private pilot certificate with a weight-shift-control or powered parachute category rating. This experience CANNOT be used for any other FAA certificates or ratings. This time must have been logged in accordance with the provisions for logging aeronautical experience specified by an FAA recognized ultralight organization and in accordance with provisions for logging pilot time in an aircraft as specified in §61.51.

You must have obtained this experience as a registered ultralight pilot with one of the FAA recognized ultralight organizations. The four FAA recognized ultralight organizations are:

- ASC – Aero Sports Connection
- EAA – Experimental Aircraft Association
- USHPA – United States Hang Gliding and Para Gliding Association
- USUA – United States Ultralight Association

While there has been some confusion about the transition for both ultralight pilots and vehicles, it is important that you understand the process and how it will affect you, especially if you are a transitioning pilot. The Light-Sport Aviation Branch, AFS-610, is here to support you in answering questions about light sport aviation topics. Please give us a call at (405) 954-6400.

Larry W. Clymer is the Manager of Flight Standards Service's Light-Sport Aviation Branch.



Be Part of the Solution at West Palm Beach Airport (PBI)

Editor's Note: We published an article we received from one of the FAA Safety Team members in Florida in the January/February 2007 issue about the number of pilots landing on Taxiway "L" at Palm Beach International Airport (PBI). We received several comments about the non-standard taxiway/airport markings described in the article as well as a request for more information about the problem. The following is an outline provided FAA Aviation News *by some of the team members working on this issue. The report lists some of the on-going efforts to prevent pilots from landing on the taxiway. As you can see, there are many organizations involved in this effort. The pilot community can do its part by not landing on the taxiway.*

On December 12, 2004, a new parallel taxiway to runway 9R/27L, TAXIWAY (TW) "L" opened. Problems occurred with this new parallel taxiway even before it opened. On September 7, 2004, a pilot landed on TW L while the taxiway was still under construction. Since then another 21 "L" landings have occurred on TW L.

Through the Regional Runway Safety Program Office, the following efforts and projects have been completed at PBI:

- Palm Beach County Department of Airports (DOA) painted a rounded corner on the southwest corner of TAXIWAY "L."
- DOA repainted and outlined the runway numbers of RWY 9R/27L.

- The Air Traffic Control Tower (ATCT) included a cautionary message on the ATIS concerning TAXIWAY "L."
- DOA installed Runway End Identifier Light (REIL) systems on RWY 9R/27L that operate continuously.
- Published warnings in the *Airport/Facility Directory* and FAASAFETY.GOV.
- ATCT briefed the Fixed Base Operator's (FBO's) and posted flyers for transient pilots.
- DOA/ATCT/FSDO Safety personnel conducted several Pilot / Controller Forums informing local pilots.
- DOA painted the word "TAXIWAY" in the middle and on both end of TAXIWAY "L." This was a non-standard marking and required approval through FAA Washington Headquarters.
- ATCT recruited assistance from the FAA Technical Center Airport Safety Technology R&D section, AAR-411.
- Airports Line of Business (LOB) asked the FAA Technical Center to support sending someone down to PBI to evaluate the taxiway landings situation. Omni-Directional REILs for runway 9R/27L were recommended and are scheduled for installation by the DOA

With all these efforts, Palm Beach International Airport continues to experience aircraft landing on TAXIWAY "L." As a pilot, be a part of the solution, STOP LANDINGS on TAXIWAY "L."

+

FAA Aviation News *would like to thank Anna Cohen, FAA Southern Region Office of Runway Safety; Linda Berkowitz, Southern Region Airport Division; Joseph Robert, PBI Air Traffic Control Tower Manager; and Gary Sypek and Lisa De La Rionda of the PBI Airport Authority, Southern Region FAASTeam Program Managers Rene Alvarez, Neal F. Morris, and Michael Keane.*

The FAA – Transport Canada Pilot Licensing Agreement

A New Era in Foreign Pilot Licensing

by Lance Nuckolls

The FAA and Transport Canada (TC) entered into a new pilot licensing agreement December 1, 2006, that allows persons who have an FAA private, commercial, or airline transport pilot certificate with an airplane single- or multi-engine land rating, airplane type rating, and instrument rating to obtain a similar TC pilot license; and likewise for a person holding a TC pilot license to obtain an FAA pilot certificate. This agreement is officially known as the FAA and TC Implementing Procedures for Licensing (IPL), and it is based on a Bilateral Aviation Safety Agreement between the United States and Canada that became effective June 12, 2000.

One thing that is significantly different about this new pilot licensing procedure is that a TC pilot license can now be issued on the basis of a FAA pilot certificate and the continued validity of the TC pilot license is no longer dependent on the continued validity of the original FAA certificate. This is also true for a FAA pilot certificate that is issued on the basis of a TC pilot license. In addition, a TC pilot license holder can convert up to an airline transport pilot license and any airplane type rating (more than just a Private pilot license and instrument as allowed under the current U.S. aviation regulations).

But first, some clarification on the terms "pilot certificate" and "pilot license" is needed. Since the FAA certificates pilots, we issue pilot certificates and ratings to anyone who completes the FAA required pilot training and passes both a knowledge test and a practical test for same. However our Canadian counterpart, Transport Canada - Civil Aviation (TCCA), like most other foreign civil aviation authorities, licenses pilots by issuing a pilot license to anyone who passes the TCCA required pilot training and passes both a knowledge test and a skills (practical) test. This is obviously a matter of semantics since both the FAA and TCCA require specific aeronautical knowledge and pass a skills (practical) test before a person is issued a private, commercial, or airline transport pilot license and ratings. Therefore, for the purpose of this article and the IPL agreement, the terms "license" and "certificate" are considered the same.

Though the FAA and TCCA have specific pilot training and pilot testing requirements, as well as oversight requirements, that must be met before a pilot license or rating can be issued, the training and testing requirements, reference material, and oversight are not identical between the FAA and TCCA. So before the FAA and TCCA could enter into the IPL agreement, both had to determine that each had a system of pilot training, testing, and oversight that met an equivalent level of safety. It took hundreds of hours of meetings between the FAA and TCCA before it was finally determined that each other's pilot training and licensing system met a comparable level of safety. This effort included the FAA Flight Standards Service staff from International Programs and Policy Office (AFS-50), Regulatory Support Division (AFS-600), Civil Aviation Registry Division (AFS-700), General Aviation and Commercial Division (AFS-800), and TCCA staff, as well as FAA and TCCA technical contract staff and legal staff review. Coordinating the effort and achieving the IPL agreement was truly a monumental effort, as gauged by any standard.

What does the IPL permit that could not be done before? As mentioned earlier, a pilot license issued under the IPL solely on the basis of the original foreign pilot license is no

longer dependent on the continued validity of the original foreign license. For example, a TC license issued on the basis of an FAA certificate using the IPL no longer requires the FAA certificate to remain valid, and likewise for a FAA certificate issued using a TC license as the basis. Also, a person may exercise the privileges of that pilot license in accordance with the laws and regulations of the issuing country. For example, a person receiving a TC commercial pilot license based on their FAA commercial pilot certificate, may exercise the privileges of that TC license in a Canadian registered aircraft provided all of the pertinent Canadian regulations were being met including any applicable immigration regulations for foreign pilots working in Canada—and vice versa in the U.S. for a person receiving an FAA pilot certificate. In addition, the IPL has commerce implications going both ways across the U.S. – Canadian border. Barring any immigration issues, U.S. citizens having a TC commercial pilot or airline transport pilot (ATP) license that was issued on the basis of their FAA pilot certificate under the IPL could be employed in Canada to exercise the privileges of a commercial pilot or ATP in a Canadian registered land airplane; and likewise for a Canadian citizen holding a similar pilot certificate in the United States. This can include, but is not limited to, U.S. operations conducted under 14 CFR parts 121, 125, 133, and 135 and for similar operations in Canada.

Mario Toscano photo

Flight Standards Director Jim Ballough, left, and Transport Canada's Director of Aircraft Maintenance, Don Sherritt, sign the agreement.

Currently, the IPL only applies to pilots holding airplane land ratings, airplane land type ratings, and instrument ratings. It does not apply to pilots holding other aircraft category, class, and type ratings (i.e. glider, seaplane, rotorcraft, balloon), though that is planned to occur at a later date.

If you wish to obtain a TC pilot license based on your FAA certificate, please refer to the Transport Canada Civil Aviation (TCCA) General Aviation Advisory Circular 401-001 that can be found at <http://www.tc.gc.ca/CivilAviation/general/circulars/gaac0601.htm>. Likewise, if you want to obtain an FAA pilot certificate based on your TC pilot license, please refer to FAA Advisory Circular AC 61-135 that can be found at <http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf>. It should be noted here that there are some differences between the licensing requirements that had to be addressed separately. These differences and how they are being addressed can be found in the FAA and TCCA Advisory Circulars.

By the time you read this, many of your fellow pilots will have already taken advantage of this IPL agreement. Looking beyond this IPL agreement with Canada, the FAA is now exploring the possibility of having IPL agreements with other countries.

Lance Nuckolls is an Aviation Safety Analyst for the Flight Standards Certification and General Aviation Operations branch (AFS-810) in Washington, DC.

FITS and Learner Centered Grading

(Continued from Page 24)

there a way to lose altitude and slow down more effectively? (This could lead into a discussion on engine thermal shock.) What system do you use to determine when you should start your descent? (This could lead to discussion on the use of the SRM techniques and use of the descent planning page on the multifunction display or MFD.) Why didn't you try to land anyway? If you had attempted to land, what might have been the consequences? (This could lead to a discussion of NTSB overrun accidents.)

LAST WORD

The FITS Web site contains many generic syllabi, including Private/Instrument combined, Transition, Recurrent, and Flight Instructor (learning FITS), as well as an avionics guide, and is located at <http://www.faa.gov/education_research/ training/fits/training/generic/>. These documents contain objectives, tasks, and LCG schema. We are in the process of developing generic private, commercial, instrument, and flight instructor FITS syllabi. I recommend you try LCG. From the surveys we've collected, the data indicates that both the PTs and instructors begin to like using the LGC method, and the PT's progress faster through their flight training as fewer flights have to be repeated

Fly safe.

Tom Glista is an aviation safety inspector with Flight Standards Services' General Aviation and Commercial Division.

NOTICE OF PROPOSED RULEMAKING

A Notice of Proposed Rulemaking (NPRM) involving 14 Code of Federal Regulations (14 CFR) parts 61, 91 and 141 was published in the *Federal Register* (FR) on Wednesday, February 07, 2007, in Volume 72, Number 25. The NPRM's title is *Pilot, Flight Instructor, and Pilot School Certification.* The NPRM, listed under the Department of Transportation and Federal Aviation Administration, starts on page 5806.

According to the NPRM's summary, "The FAA proposes to amend the training, qualification, certification, and operating requirements for pilots, flight instructors, ground instructors, and pilot schools. These changes are needed to clarify, update, and correct our existing regulations. These changes are intended to ensure that flight crewmembers have the training and qualifications to enable them to operate aircraft safely."

The NPRM's many proposed changes include establishing flight instructor certificates without an expiration date, establishing training for operating with night vision goggles (NVG), permitting a pilot performing the duties as pilot in command (PIC) while under the supervision of a qualified PIC to log PIC time, permit the use of flight simulators, flight training devices, or PCATD for performing instrument recent flight experience, add a night vision recent operating experience requirement to remain PIC qualified for NVG operations, permit the use of a PCATD to be used for 10 hours of instrument time, allow issuing flight instructor certificates to military instructor pilots who graduate from a U.S. military instructor school, and clarify the amount and content of ground and flight training for the add-on category and/or class rating courses in the recreational, private, commercial, and ATP certification courses for part 141 schools.

The NPRM explains how interested parties can comment on the proposed changes. Alternative ways of accessing the NPRM include the Internet by checking the following Web sites. The Department of Transportation's electronic Docket Management System (DMS) at <http://dms.dot.gov/ search>. The FAA's Regulations and Policies Web page at <www.faa.gov/regulations_policies>. The Government's Printing Office (GPO) Web page at <http://www.gpoaccess.gov/fr/index.html>.

A copy of the document can be requested in writing by sending a request to the Federal Aviation Administration, Office of Rulemaking, ARM-1, 800 Independence Ave., S.W. Washington DC 20591 or by calling (202) 267-9680.

When referring to the NPRM officially or requesting a copy from FAA, its DOT/FAA Public Docket Number is FAA-2006-6661; Notice No. 06-20.

Comments about the NPRM must be received by the FAA on or before May 8, 2007.

TWO YEAR IA RENEWAL

FAA has amended Title 14 Code of Federal Regulations §65.93 extending the Inspection Authorization (IA) renewal period from every year to every two years. The new renewal period begins on April 1 of each odd-numbered year to March 31 of the next odd-numbered year. The IA period is made up of two periods of one year duration, each with an activity (work performed, training, or oral examination) requirement. If the applicant for an IA does not meet the activity requirements at the end of an even-numbered year, he or she may not exercise the privileges of the IA certificate in the odd-number year without taking and passing an oral test with the local Flight Standards District Office.

This rulemaking was in response to concerns regarding the administrative burden associated with the renewal of inspection authorizations under CFR § 65.93. However, since this was a direct final rule, if significant negative comments are received, the rule may have to be withdrawn. The final rule can be found at <http://www.faa.gov/regulations_policies/rulemaking/recently_published/>.

FAA BOOSTS SAFETY FOR AIR TOURS

The FAA has issued new regulations on commercial air tours, which appeared in the February 13 *Federal Register*. Air tour operators will now have to meet the safety requirements in the expanded National Air Tour Safety Standards of the Federal aviation regulations, including some operators who were not previously covered by those standards. The new regulations affect Title 14 Code of Federal Regulations parts 61, 91, 119, 121, 135, and 136. They include requirements for enhanced passenger briefings before takeoff, life preservers and helicopter floats for certain overwater operations and helicopter performance plans. The rules apply as well to the growing air tour industry that offers tours of America's national parks.

"These new standards will increase overall air tour safety, improve the FAA's ability to track and monitor commercial air tour flights, and help us identify and address operational trends that could lead to accidents," said FAA Administrator Marion C. Blakey.

The new regulations maintain the FAA's practice of promoting flights for charity. The allowance for use of private pilots continues, but the minimum total flight experience time of 200 hours increases to 500 hours. Dozens of exemptions that charities formerly operated under are replaced

by conditions and limitations inserted directly into the regulations.

The new rules establish better oversight of the commercial air tour industry, especially flights previously conducted under the general operating and flight rules section of the regulations. In the past, the FAA has found it difficult to track where some commercial air tours were conducted and how many there were. The reporting requirements in these regulations will let the FAA develop a data base of these flights so the agency can ensure operators are complying with the applicable regulations.

The entire National Air Tour Safety Standards final rule can be viewed at: <http://www.faa.gov/regulations_policies/rulemaking/recently_published/>.

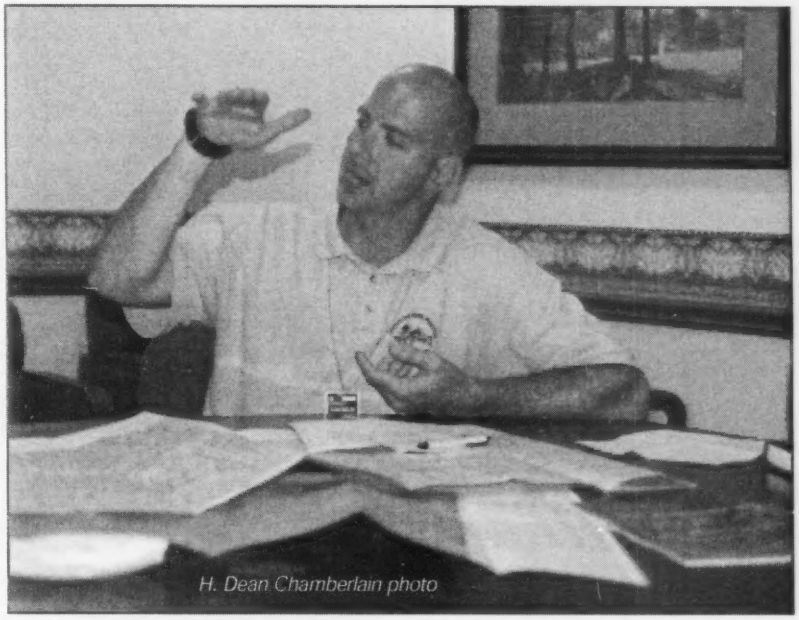
NEW PRACTICAL TEST STANDARDS RELEASED

The FAA's Airman Testing Standards Branch (AFS-630) of the Flights Standards Service has just released new Practical Test Standards (PTS) for Instrument Flight Instructor (CFII) and Helicopter Flight Instructor. These are the standards by which airmen are evaluated and serve as a pass/fail criteria. The new CFII PTS (FAA-S-8081-9C) became effective in January 2007. The new Helicopter Instructor PTS (FAA-S-8081-7B) became effective in December 2006. Students, instructors, check pilots, and anyone involved in flight instruction should make sure they are using current a PTS.

COMPLEX AIRPLANE REDEFINED

The FAA has determined that airplanes equipped with retractable landing gear, flaps, and a full authority digital engine control (FADEC) meet the definition of being a complex airplane and may be used for commercial pilot and flight instructor certification. FADEC is a system consisting of a digital computer [described as an electronic engine control (EEC) or electronic control unit (ECU) and its related accessories] that controls an airplane's engine and propeller. FADEC is considered an essential part of the engine and propeller control and may be powered by the airplanes' electrical system.

FADEC systems are employed by almost all current generation turbine engines and increasingly in the newer piston engines. To date, the FAA is only aware of the Diamond Aircraft Company's DA42 that would qualify as the kind of airplane that is equipped with a retractable landing gear, flaps, and FADEC, and would meet the requirements of being a complex airplane. Any questions about the other possible makes and models of airplanes that would qualify as being similarly equipped and be considered a complex airplane should be directed to the FAA's Certification and General Aviation Operations Branch, AFS-810,800 Independence Avenue, SW, Washington, DC 20591 or call (202) 267-8212.



H. Dean Chamberlain photo

REMEMBER THE "ICE MAN?"

This was the harrowing tale of Keith Wells who encountered icing in a C-172 while returning from a Christmas trip in 2005. You can hear the pilot describe the event in his own words and listen to the ATC recordings at <www.asf.org/iceman>. If you read the article in the September/October 2006 issue of *FAA Aviation News*, you'll hear that there was no exaggeration in the description of the events. The point is clear that having options when it comes to ice and leaving yourself an out is a critical piece of flight planning. It's worth a listen, even as we approach spring. Many pilots of aircraft equipped with known icing equipment report some of their worst icing encounters late in the icing season.

PRECIPITATION AND IFR PILOTS

Precipitation, IFR Pilots and ATC is being aggressively addressed through efforts of the Aircraft Owners and Pilots Association/Air Safety Foundation (AOPA/ASF) and FAA. Each U.S. IFR pilot, with the exception of holders of Airline Transport Certificates (ATP's) who also hold a type rating, will be receiving a CD of the highly regarded, on-line course *Weatherwise: Thunderstorms and ATC*. New ATC phraseology in use by ATC describes precipitation as Light, Moderate, Heavy and Extreme. Gone are the old Video Integrator Processor (VIP) levels describing intensities as level 1-6. Some ATC facilities do not have equipment to depict Light precipitation.

In October, 2006 the National Transportation Safety Board issued a Safety Alert on this subject. In part, the Safety Alert <http://www.ntsb.gov/alerts/SA_011.pdf> pointed out that:

- Investigations show that pilots were either not advised about areas of severe weather ahead or were given incomplete information.
- Each pilot had readily available alternatives that, if utilized, would have likely prevented the accident.

The course outlines important operational procedures with a focus on general aviation. An accompanying brochure provides suggested language to use when communicating with ATC about precipitation along your route of flight.

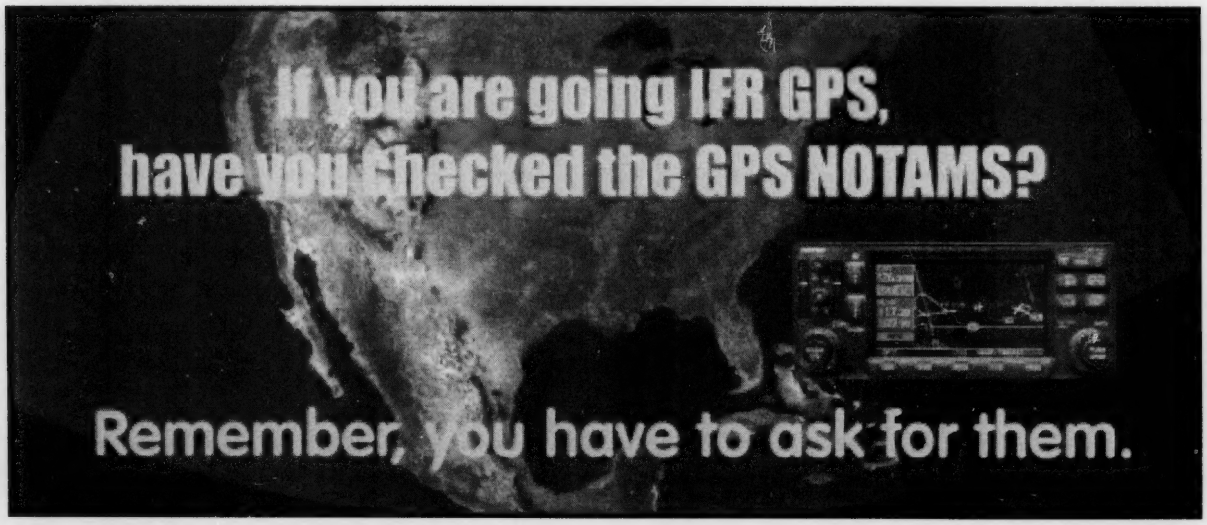
If you're in the IFR pilot group above, your CD should be in the mail to you by the time you read this.

FAA PROPOSES TO CHANGE AGE 60 RULE

In a speech to the National Press Club FAA Administrator Marion C. Blakey said "It's time to close the book on Age 60." Blakey continued "The retirement age for airline pilots needs to be raised. So the FAA will propose a new rule to allow pilots to fly until they are 65." Blakey gave a brief overview of the rule which was introduced in 1959 which prohibited pilots from flying beyond their 60th birthday on the grounds of safety and deteriorating physical abilities and health. The Administrator cited that the current rule removes from service our most experienced crew members at a time when people are living much longer than when the rule was first introduced. She also pointed out that these crew members are required to pass rigorous medical exams from specialist every six months in addition to proficiency and skills tests for flight operations.

Another goal of changing the rule is to bring the U.S. in line with the vast majority of International Civil Aviation Organization (ICAO) member countries. In November 2006 ICAO changed its recommendation to allow airline pilots to fly until age 65 as long as the other pilot is under the age of 60. Blakey plans to follow this policy. The new rule would only apply to pilots who have not yet reached the age of 60 when the rule becomes effective.

The FAA plans to publish a Notice of Proposed Rule Making (NPRM) to seek comments from the public later this year, as part of the Federal rule making process. The whole process is expected to take between 18 months to two years to complete.



Editor's Runway

from the pen of H. Dean Chamberlain

NOTAMS AND CHARTS

NOTAMS and charts: Do we take them for granted? If you have a chart—is it current? Are you sure? I am willing to bet that most charts are not current. I know you have looked at your local sectional chart and found the text block that states, "This chart will become *OBSOLETE FOR USE IN NAVIGATION* upon publication of the next edition scheduled for *ABCD, XX, 2007*. The date has not been reached yet, so you say your chart is current.

The expiration date has not passed, but does the chart have all of the latest information available published on it? My guess is it probably doesn't. The reason is, I am betting on human nature. All charts, sectionals and IFR en route charts quickly become dated. The sectionals become dated faster than the IFR charts because of the sectionals longer publication cycle. Plus in the case of the IFR charts, they don't contain all of the information published on the sectionals, such as low towers, etc.

Sectionals highlight this dating problem by stating on the chart the specific edition, the date of the edition, the date of the airspace amendments effective on the chart, as well as the date of receipt of other aeronautical data published on the chart.

Both sectionals and IFR charts contain information on how pilots can keep the charts as current as possible. In the case of sectional charts, every 56 days the latest *Airport/Facility Directory* contains a consolidated list of updates for that volume's area. Those updates are contained in the section titled "Aeronautical Chart Bulletin." The *Airport/Facility Directory (A/FD) for the Northeast U.S.* listed changes to helicopter route charts, terminal area charts, sectionals, and military training routes. As this section noted, only major changes are listed. Pilots are expected to check the A/FD airport information for the latest changes. As the introduction to the bulletin noted, since sectionals are only updated about every six months and military routes can change every 56 days, pilots must refer to *Notices to Airmen* (NOTAMS) and before flight briefings with Flight Service for the latest safety of flight information.

NOTAMS provide the most current information on known airspace changes. This assumes that FAA is notified in a timely manner of the change. Although there are three types of NOTAMS (D), (L) and (FDC) I like to think the important thing to remember is that there are published NOTAMS, electronic NOTAMS, and those that you have to ask for. For example, NOTAM information that is known far enough in advance to be published in the *NOTICES TO AIRMEN* publication are not routinely given out when you call Flight Service for a pilot briefing. The expectation is that you will have read the published material. Information that is more immediate in nature is transmitted electronically to Flight Service stations and is included in pilot briefings. Some NOTAMS, such as GPS NOTAMS, must be asked for during a pilot briefing.

The importance of NOTAM information, published and electronic, cannot be over emphasized for flight planning. For example, the published NOTAM includes in part changes to IFR routing information, approach charts and procedures.

The safety question now is, have you reviewed all of the change data available and updated your sectional or IFR charts? I bet you have not.

U.S. Department
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